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# Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Volume 24, No. 4 • July/August 2000

## Tapping Our Problems Away?

### A Critical Analysis of Thought Field Therapy

SPECIAL REPORT

## Krakatene: Explosive Pseudoscience

## Absolute Skepticism Equals Dogmatism

## A 'UFO' Close Encounter in 1803 Japan?

## Rethinking the Dancing Mania

## Does Science Education Undermine Scientific Rationality?

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

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The SKEPTICAL INQUIRER (ISSN 0194-6730) is published bimonthly by the Committee for the Scientific Investigation of Claims of the Paranormal, 1310 Sweet Home Rd., Amherst, NY 14228. Printed in U.S.A. Periodicals postage paid at Buffalo, NY. Subscription prices: one year (six issues), $35; two years, $58; three years, $81; single issue, $4.95. Canadian and foreign orders: Payment in U.S. funds drawn on a U.S. bank must accompany orders; please add US$10 per year for shipping. Canadian and foreign customers are encouraged to use Visa or MasterCard.

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Subscriptions and changes of address should be addressed to: SKEPTICAL INQUIRER, Box 703, Amherst, NY 14226-0703. Or call toll-free 1-800-634-1610 (outside U.S. call 716-636-1425). Old address as well as new are necessary for change of subscriber's address, with six weeks advance notice. SKEPTICAL INQUIRER subscribers may not speak on behalf of CSICOP or the SKEPTICAL INQUIRER.

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# Skeptical Inquirer

July / August 2000 • VOL. 24, NO. 4

## ARTICLES

29 **Can We Really Tap Our Problems Away?**
*A Critical Analysis of Thought Field Therapy*
*Thought Field Therapy is marketed as an extraordinarily fast and effective body-tapping treatment for a number of psychological problems. However, it lacks even basic empirical support and exhibits many of the trappings of a pseudoscience.*
BRANDON A. GAUDIANO and JAMES D. HERBERT

34 **Absolute Skepticism Equals Dogmatism**
*There are two main kinds of skeptics: moderate and radical. The moderate skeptics do not question the totality of knowledge. Instead, they proceed gradually, because questioning any bit of knowledge involves comparing it with another piece that is assumed, if only for the sake of the argument. By contrast, wholesale skepticism admits no benchmark and is thus an obstacle to inquiry, just like dogmatism. Scientists, technologists, and humanistic researchers practice piecemeal skepticism, which, unlike absolute skepticism, is constructive.*
MARIO BUNGE

37 **Did a Close Encounter of the Third Kind Occur on a Japanese Beach in 1803?**
*Intriguing UFO-like stories written in the Japanese books* Toen Shousetsu *and* Ume no Chiri, *which were published in 1825 and 1844 respectively, are apparently fictions based on Japanese folklore. Illustrations of the UFO-like boats in these books are results of a combination of folklore and imagination.*
KAZUO TANAKA

42 **Rethinking the Dancing Mania**
*While medieval dance frenzies have long been regarded as a classic example of stress-induced mental disorder affecting mostly women, there is much evidence to the contrary.*
ROBERT E. BARTHOLOMEW

48 **Has Science Education Become an Enemy of Scientific Rationality?**
*Despite the highest levels of general science education in history, distrust of science seems on the rise and the pseudosciences are flourishing. Students may reveal why this paradox exists.*
ANDREW EDE

## SPECIAL REPORT

18 **Krakatene: The Name is Just Fine, But It Can't Be $C_6$**
*Explosive pseudoscience from the Czech Academy of Science*
ZDENĚK SLANINA

## COLUMNS

**EDITOR'S NOTE** ..... 4

**NEWS AND COMMENT**
*SRAM* Articles Lead to Alternative Medical Doctor's Resignation / Dr. Scholl's Steps into Pseudoscience with Magnetic Insoles / Evidence on Antioxidants Still Insufficient, But New Report Says Megadoses Are Risky / 'Intelligent Design' Goes to Washington: Evolution Opponents Brief Congress / 'Powers of the Paranormal': Another Fox TV Outrage / *Newsweek* Publishes Poll on Miracles ..... 5

**NOTES OF A FRINGE-WATCHER**
David Bohm and Jiddo Krishnamurti
MARTIN GARDNER ..... 20

**INVESTIGATIVE FILES**
Stigmata: In Imitation of Christ
JOE NICKELL ..... 24

**NEW BOOKS** ..... 57

**SCIENCE BEST SELLERS** ..... 58

**ARTICLES OF NOTE** ..... 57

**CONFERENCE REPORTS**
The New Paranatural Paradigm: Special APS Session Examines Pseudoscience
DONALD MAINFORT ..... 12

Conference Examines Efficacy, Safety of Medicinal Herbs
DENISE GRADY ..... 15

**FORUM**
Templeton and the AAAS
RALPH ESTLING ..... 59

**LETTERS TO THE EDITOR** ..... 61

## BOOK REVIEWS

*Voodoo Science: The Road from Foolishness to Fraud*
By Robert Park
GERRY RISING ..... 52

*Mind Myths: Exploring Popular Assumptions About the Mind and Brain*
Edited by Sergio Della Sala
BENJAMIN RADFORD ..... 53

*Three Seductive Ideas*
By Jerome Kagan
MARK DURM ..... 54

*The Age of Spiritual Machines*
By Ray Kurzweil
RUDOLPH MUSKA ..... 56

## EDITOR'S NOTE

# *The Visible Appeal of Invisible Energy Fields*

One common theme of much modern pseudoscience is the idea that "power" or "energy" emanates from the human body and can be treated and manipulated. The Chinese concept of *chi* is based on it (SI, Summer 1988, July/August 1996, September/October 1996). We've seen the idea applied recently to therapy with Eye Movement Desensitization and Reprocessing Therapy (EMDR, see SI, January/February 1996) and Therapeutic Touch, which is taught in many university nursing schools and actually involves waving the hands over a patient without touching her (see SI, Winter 1993 and Spring 1993).

In this issue, psychologists Brandon Gaudiano and James Herbert of MCP Hahnemann University in Philadelphia critically examine what they say threatens to become the premier "power therapy" of the twenty-first century: Thought Field Therapy. This bizarre therapy is based on the idea that there exist invisible energy fields called "thought fields," whose occasional blockages are the root cause of all psychological problems. The TFT therapist taps on the body's "energy meridians" in specific sequences to "add energy" to the system and help rebalance the energy flow.

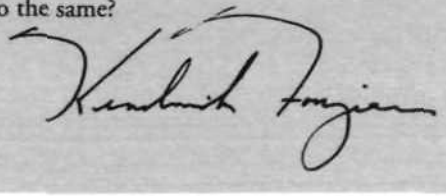
We've written briefly of Thought Field Therapy earlier, in Lilienfeld and Lohr's report on sanctions recently assessed on several of its practitioners (SI, March/April 2000). But this is our first full-length article on this questionable therapeutic fad, which, like those before it, somehow manages to gain followers among practitioners despite lack of any peer-review or scientific publication.

* * *

Did a Close Encounter of the Third Kind occur on a Japanese beach in 1803? This is the provocative question asked (and answered) by Kazuo Tanaka, a professor of electrical and computer engineering at Japan's Gifu University, in his article in this issue. We are used to hearing "close encounter" stories from the latter part of the twentieth century in the United States, but Tanaka explores one of more exotic origin—early nineteenth-century Japan. History, literature, folklore, and imagination are entwined in this story. Despite the many differences in language and culture and circumstance from what we're used to, the article carries lessons in how the dynamics of such stories have ancient roots.

* * *

Something with even more ancient roots are reports of stigmata, in which the wounds of Christ's crucifixion allegedly are duplicated spontaneously upon the body of a devout Christian. Stigmata reports go back to the time of St. Francis of Assisi (1182–1226), credited with being the first stigmatic. But last year brought a resurgence of accounts in books, TV pseudodocumentaries, and movies. In this issue CSICOP Senior Research Fellow Joe Nickell, in his Investigative Files column, examines the entire history of these reports and applies his scholarship and keen investigative skills to teasing out what's going on. He even carried out a few experiments on himself in the name of critical inquiry. How many of us would do the same?

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THE MAGAZINE FOR SCIENCE AND REASON



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# *SRAM* Articles Lead to Alternative Medical Doctor's Resignation

A nationally prominent alternative medicine advocate, Dr. Lewis Mehl-Madrona, was forced to resign from the University of Pittsburgh Medical Center (UPMC) in early February, just days after an embarrassing exposé in the local Pittsburgh press. Mehl-Madrona is a close friend and protégé of Andrew Weil, the leader of the Integrated Medicine movement.

The front-page feature article published February 6 in the *Pittsburgh Post-Gazette* announced that Mehl-Madrona was the focus of a special investigation by UPMC. The investigation was due in part to the recent publication of three articles highly critical of his beliefs and activities in the *Scientific Review of Alternative Medicine* (*SRAM*). The articles were written by a Pittsburgh health consumer advocate, Patrick Curry, who had been upset at UPMC's hiring of Mehl-Madrona in October 1997 as the Medical Director of UPMC's newly established Center for Complementary Medicine.

Curry is quoted in the article, saying, "I'm very concerned that rational thinking not be undermined" and that "it's important that religion and science operate on separate planes. If they don't, people will be less and less able to distinguish between evidence-based medicine and charlatanism."

The *Post-Gazette* article described Mehl-Madrona's claims in his book *Coyote Medicine* to have cured advanced ovarian cancer by removing traumatic memories from a woman's pelvis and to have channeled Native Indian spirits to cure prostate cancer. The reporter, at Mehl-Madrona's invitation, prepared for this story by attended a sweat-lodge ceremony in the Pittsburgh suburbs. A Roman Catholic cancer patient who believed she had been a Native American in a previous life was treated by Mehl-Madrona with sweat-lodge prayers carried to heaven on tobacco smoke. She told the reporter that she was convinced she was cured.

This apparently was too much for UPMC. Mehl-Madrona was asked to resign. As part of the settlement, Mehl-Madrona agreed not to discuss the circumstances of the resignation. He further stated he is in negotiations with two other academic medical centers about running complementary medicine programs similar to that at UPMC.

When Curry, a retired computer systems engineer, read Mehl-Madrona's book in 1997, he says he was appalled. The book contained many accounts of mystical healing claims and a seeming contempt for modern science. As Curry researched Mehl-Madrona, he was further disturbed by his long involvement with the Transpersonal Psychology movement, a product of the psychedelic mysticism of the 1960s and 1970s. He was especially disturbed that Mehl-Madrona had become a major presence in Pittsburgh, lecturing on his book, on herbal treatments, and proselytizing for alternative medicine throughout the community.

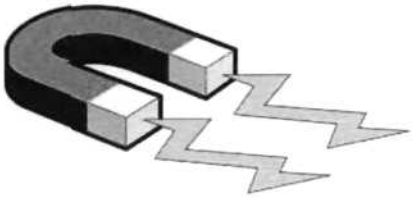
Curry wrote a lengthy complaint about Mehl-Madrona to the chairman of the Department of Medicine at UPMC-Shadyside Hospital, where the complementary center is located. His complaint went unanswered. He contacted the local press, but found only alternative medicine sympathizers. He could find no academics or medical professionals willing to look into this matter. Finding no local support, he sought aid from the national skeptical and anti-health-fraud communities, eventually making contact with Wallace Sampson, editor of the recently established *Scientific Review of Alternative Medicine*. At Sampson's invitation, Curry wrote a book review of *Coyote Medicine*, a short history of the UPMC Center for Complementary Medicine, and "The Making of a Complementary Medicine Man," tracing Mehl-Madrona's bizarre career path under the tutelage of a number of New Age gurus.

In late summer of 1999, Curry renewed his complaint, bringing the articles and additional supporting materials to the leadership of UPMC and the University of Pittsburgh School of Medicine. Responding to Curry's persistent urging, UPMC created a blue ribbon panel in December headed by the senior vice president and the medical director to investigate Mehl-Madrona and to review UPMC's entire alternative medicine program. This investigation was in progress when the *Post-Gazette* article was published.

Curry told SKEPTICAL INQUIRER, "I can't overstate my appreciation for the information and support I've received from the national skeptical community. I'm now a subscriber both to SKEPTICAL INQUIRER and *The Skeptic* and I have used the skeptical and anti-health-fraud Web sites to help in my research." Curry says one of the most important morale-boosters he had during this period was the April 1998 publication in the *Journal of the American Medical Association* of 11-year-old

Emily Rosa's debunking of Therapeutic Touch. "I figured if Emily can do that, then this Pittsburgh situation shouldn't be all that difficult, after all."

*Postscript:* By the end of March, Mehl-Madrona had accepted an offer to be the program director of newly established Center for Health and Healing at Beth Israel Medical Center in New York City. This complementary medicine center will be affiliated with Albert Einstein School of Medicine. He was gloating that his position is an improvement over his old position at UPMC.



## Dr. Scholl's Steps into Pseudoscience with Magnetic Insoles

Alternative medicine has enjoyed a remarkably high profile over the past several years. It has turned into a multi-billion dollar industry, and major health care companies that ten years ago wouldn't try to sell unproven, non-FDA-approved remedies now do so openly. One of the latest (and thus far the most reputable) companies to join the lucrative market is Dr. Scholl's, which recently introduced Magna-Energy magnetic shoe insoles.

According to promotional literature, "These insoles have revolutionized the insole category by combining magnet therapy with performance proven comfort technology. The exclusive bipolar magnet system found in our Magna-Energy Insoles allows alternating waves of magnet therapy to penetrate your body through the soles of the feet. In addition, they provide excellent cushioning comfort, absorb shock, and are designed to enhance pain relief."

Perhaps aware of the shaky basis for magnetic therapy, Dr. Scholl's avoids directly claiming that the magnets provide any benefit whatsoever. A careful reading of the statement above reveals that the issue of magnets is separated from the claim of pain relief: The only statement about magnets given is that magnetic waves penetrate the soles of the feet.

No claim is made regarding the benefits of those "alternating [magnetic] waves." Of course, new insoles frequently make feet feel better with or without magnets. This will likely lead many consumers into the *post hoc ergo propter hoc* reasoning fallacy ("after this, therefore because of it"): "I used the magnetic insoles, and my feet felt better, therefore the magnets worked."

The Dr. Scholl's Web site has links to the American Podiatric Medical Association (APMA). I contacted the association asking if they know of any scientific proof that magnetic therapy has any therapeutic value. The response was, "The APMA has no position statement regarding the use of magnetic insoles." Essentially a "no comment," it's not exactly a ringing endorsement from the premier podiatry association in America.

By some accounts, magnetic therapy dates back to the 1500s, when physician and alchemist Paracelsus reasoned that since magnets have the power to attract iron, they might also be useful for attracting and "leaching" disease from the body. Since then, magnets have been proffered as cures for nearly every ailment ranging from arthritis to cancer. A 1997 study at Baylor College suggested that permanent magnets reduced pain in post-polio patients, although the study has been criticized on several grounds (see "Magnetic Therapy: Plausible Attraction?" SI July/August 1998). Other studies have showed no effects, and clearly much more research is needed to verify the myriad claims of magnetic therapy.

*—Benjamin Radford*

*Benjamin Radford is Managing Editor of the* SKEPTICAL INQUIRER.

## Evidence on Antioxidants Still Insufficient, But New Report Says Megadoses Are Risky

Insufficient evidence exists to support claims that taking megadoses of dietary antioxidants, such as selenium and vitamins C and E, can prevent chronic diseases, says the latest report on Dietary Reference Intakes (DRIs) from the Institute of Medicine of the National Academies. The same conclusion applies to carotenoids, including beta-carotene.

In fact, extremely large doses may lead to health problems rather than confer benefits. But the report, issued April 10 in Washington, did call for increases in daily intakes of vitamins C and E to exploit their role in maintaining good health, and recommended an even larger amount of vitamin C for smokers.

For the first time, the report also sets a ceiling on daily consumption of selenium and vitamins C and E to reduce the risk of adverse side effects from overuse. Dietary antioxidants are nutrients that help protect cells from a normal—but damaging—physiological process known as "oxidative stress."

Such nutrients are a part of the natural makeup of many types of food, particularly fruits and vegetables. They also have been added to some foods and are available in the form of dietary supplements. For years, researchers have sought to understand the role of these antioxidants in reducing the risk of chronic diseases such as cancer, cardiovascular disease, eye diseases, and neurodegenerative diseases, which include Alzheimer's and Parkinson's. But many unanswered questions remain.

"A direct connection between the intake of antioxidants and the prevention of chronic disease has yet to be adequately established," said Norman I. Krinsky, chair of the study's Panel on Dietary Antioxidants and Related Compounds, and a professor of biochemistry, Tufts University School of Medicine, Boston.

"We do know, however, that dietary antioxidants can in some cases prevent or counteract cell damage that stems from exposure to oxidants, which are agents that affect a cell's molecular composition. But much more research is needed to determine whether dietary antioxidants can actually stave off chronic disease."

The report—the third in a series on dietary recommendations for healthy Americans and Canadians— expands on the Recommended Dietary Allowances (RDAs) that the National Academy of Sciences has set periodically since 1941, and on Canada's Recommended Nutrient Intakes.

The report examines available scientific data on both beneficial and harmful health effects of four nutrients typically found in food: vitamins C and E; selenium; and carotenoids, some of which are sources of vitamin A for human beings. Whether carotenoids, including beta-carotene, function as antioxidants when consumed is still unknown.

Although numerous epidemiological studies have suggested that foods rich in dietary antioxidants have a positive effect on chronic diseases, insufficient evidence exists to conclude that such nutrients, even in very high doses, will reduce the risk of diseases such as cancer; cardiovascular disease; cataracts; age-related macular degeneration, a common form of blindness in elderly people; diabetes mellitus; and neurodegenerative diseases.

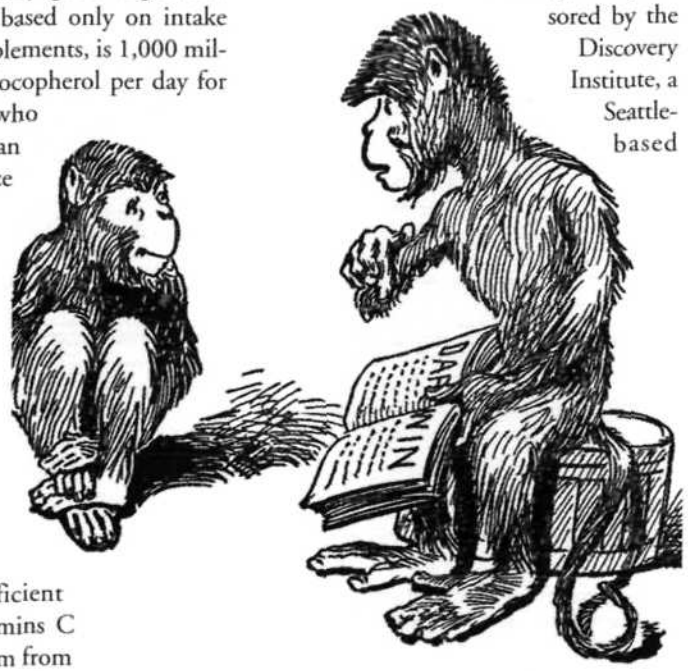
In addition to setting daily intakes for vitamins C and E and selenium, the report establishes "tolerable upper intake levels" for each of these three nutrients. The report underscores the finding that upper levels, or ceilings, should not be considered the recommended amount. Instead, they represent the maximum intake of a nutrient that is likely to pose no risk of adverse health effects in almost all individuals in the general population.

Here are several highlights of the report's recommendations:

Vitamin C—Recommended intake levels of this nutrient were increased to achieve maximum saturation in the body. Women should consume 75 milligrams per day, and men should consume 90 milligrams daily. Food sources of the nutrient include citrus fruit, potatoes, strawberries, broccoli, and leafy green vegetables. The report sets the upper intake level for vitamin C, from both food and supplements, at 2,000 milligrams per day for adults. Intakes above this amount may cause diarrhea.

Vitamin E—Recommended daily intake levels also were increased for this nutrient; both women and men should consume 15 milligrams from food. Food sources include vegetable oils, nuts, seeds, liver, and leafy green vegetables. The upper level, based only on intake from vitamin supplements, is 1,000 milligrams of alpha-tocopherol per day for adults. People who consume more than this amount place themselves at greater risk of hemorrhagic damage because the nutrient can act as an anticoagulant.

The report noted that most American and Canadian adults already get sufficient quantities of vitamins C and E and selenium from their food.



## 'Intelligent Design' Goes to Washington: Evolution Opponents Brief Congress

Supporters of intelligent design theory (the latest version of creationism) brought their message to Capitol Hill May 10 in a series of events for members of Congress and their staff. A three-hour briefing focused on the scientific evidence for the origin and development of life and the universe as the work of an intelligent designer.

A House Judiciary Committee hearing room was the site of the briefing on paleontology, biology, and cosmology. Although presentations were at times quite technical, the speakers were not there to discuss the latest research in these fields. They were on Capitol Hill to promote intelligent design (ID) theory, to debunk Darwinian evolutionary theory, and to expose the negative social impact of Darwinism.

Entitled "Scientific Evidence of Intelligent Design and its Implications for Public Policy and Education," the briefing was sponsored by the Discovery Institute, a Seattle-based think tank (www.discovery.org), and its Center for the Renewal of Science and Culture. The afternoon briefing was preceded by a private luncheon in the US Capitol for members of Congress and was followed by an evening reception.

Until now, the creation-evolution debate has primarily been active at the state and local level, but this event may represent the start of a new effort to involve Congress in efforts to oppose the teaching of evolution. Whether by chance or by design, the briefing took

place as the Senate entered its second week of debate on overhauling federal K-12 education programs. Both houses are expected to work throughout the summer on reauthorization of the Elementary and Secondary Education Act. More on that subject at www.agiweb.org/gap/legis106/ike106.html.

The briefing featured a number of the leading lights in the ID movement, including Lehigh University biology professor Michael Behe, author of *Darwin's Black Box*; Whitworth College philosophy professor Stephen Meyer, who directs the Center for the Renewal of Science and Culture; Discovery Institute Fellow Nancy Pearcey, coauthor with Chuck Colson of *How Now Shall We Live?*; and Berkeley law professor Phillip Johnson, author of *Darwin on Trial*. Behe and Meyer spoke first, focusing on a scientific explanation of ID theory and discussion of the weaknesses of Darwinian theory. The second two speakers, Pearcey and Johnson, focused on social and political implications of the competing worldviews represented by these two theories.

Approximately fifty people attended the briefing, including a handful of congressional staff and several members of Congress. The chairman of the House Judiciary Subcommittee on the Constitution, Rep. Charles Canady (R-Florida), provided the room. Senator Sam Brownback (R-Kansas) made remarks comparing the current Kansas social controversy over evolution to the one spawned by abolitionist John Brown. More significant was the appearance of Rep. Tom Petri (R-Wisconsin), who warmly introduced several of the speakers. Petri is slated to become chairman of the House Education and the Workforce Committee in January, replacing retiring chairman Bill Goodling (R-Pennsylvania). Other congressional co-hosts listed on the press release included House Science Committee members Roscoe Bartlett (R-Maryland) and Sheila Jackson-Lee (R-Texas), and Education Committee member Mark Souder (R-Indiana).

Position statements issued by the American Geological Institute and several of its member societies on the teaching of evolution can be found at www.agiweb.org/gap/positionstatements.html. An update on recent developments in the creation-evolution controversy can be found at www.agiweb.org/gap/legis106/evolution.html.

This is a shortened form of a special update prepared by David Applegate, Government Affairs Program, American Geological Institute, Alexandria, Virginia 22302-1502.

TM

## 'Powers of the Paranormal': Another Fox TV Outrage

Those of us who thought the Fox television network had nowhere to go but up after airing their pseudodocumentary "Signs from God" (reviewed in the November/December 1999 SKEPTICAL INQUIRER) should have been more, well, skeptical. The May 11, 2000, program "Powers of the Paranormal: Live on Stage!" reached even lower standards of responsibility by dispensing with even token skepticism.

Absent were any skeptical voices, or any other vestige of critical thinking, other than a fig leaf of a disclaimer to hide their naked hucksterism: "The following program deals with a controversial subject. The theories expressed are not the only possible interpretation. The viewer is invited to make a judgement based on all available information." They certainly got that right, but unsuspecting viewers might not realize just how likely the other possible interpretations are.

Let me mention a few examples. When "Perceptionist" and "Human Lie Detector" Joel Bauer correctly determined which of four people had produced each of as many drawings, might he have used one of the many methods employed by "mentalists" (stage magicians who perform mind-reading tricks)? Or when he—and later "celebrated paranormalist" Uri Geller—divined and reproduced a volunteer's supposedly secret sketch, might they have used one of the subterfuges readily available from conjuring texts and magic supply houses?

Again, when "hypnotherapist" Michele Gauzy and "master hypnotist" Tom Silver plied their alleged entrancing powers—Gauzy to "regress" two volunteers to their "past lives" and Silver to help relieve another's fear of spiders—might there have been more than meets the eye? Viewers were told in a very quick aside that the mesmerists had previously hypnotized the subjects. Might they have utilized the old stage hypnotist's technique of beginning with several volunteers, then selecting only those who exhibited strong propensities for compliance and fantasy production?

For example, when Gauzy asked the "regressed" subjects to describe their supposedly centuries-old dress and surroundings, and to relate their mode of death, how were their responses any different than if they were merely invited to imagine them? And when Tom Silver performed the old "rigid body" stunt (in which "hypnotized" subjects are placed horizontally with supports only at their shoulders and feet, and someone stands on their unsupported midriffs) why should we be more impressed than when it is done by children as an age-old parlor trick? (For a discussion, see *Secrets of the Amazing Kreskin*, Prometheus Books, 1991, p. 46.)

Yet again, when Jeff and Tessa Evanson performed the spiritualistic

"table-tipping" phenomenon, why did they select volunteers who had raised their hands when asked if they had successfully used a Ouija board, which likewise relies on movements due to the ideomotor effect (i.e., unconscious muscular activity)? Could it be they preferred subjects who would be likely to help things along? And when Jeff caused the table to seemingly adhere to his hand and be lifted off the stage, might he have been performing that feat the way it has been done by countless magicians and phony spiritualists for many generations?

Furthermore, why should we be impressed with Bill Burns' "Séance of the Century"? After some standard spirit-possession twitches, Burns delivered the monologues allegedly from Marilyn Monroe and Andy Kaufman that were convincing to the actress's first husband and two of the comedian's friends. But weren't those sitters expecting to validate the endearing messages?

Then there was Joe McMoneagle, a former member of the US government's failed psychic spying project. Unlike some of the other performers—whose feats went suspiciously well, McMoneagle appears to actually rely on paranormal ability.

Unfortunately, his remote viewing experiment cast doubt on his powers, although the program's host and a volunteer dispatched to the site McMoneagle was to clairvoyantly view, were as helpful as possible in converting his failed impressions into successes.

The "sculpture" he saw coming out of the "water" scarely matched the modernesque restaurant at Los Angeles International Airport, unless one applies a generous helping of "retrofitting" (after-the-fact interpretation).

Of course there was, as McMoneagle envisioned, a "well-defined concrete edge," but then where in the greater Los Angeles area would that *not* be found? (In this case a sidewalk filled the bill.)

Produced by Jeff Margolis Productions, this special was an affront to science and rationality. Can Fox sink any lower in its credulous, snake-oil approach to the paranormal? Unfortunately, I suppose, we'll have to stay tuned and see.

*—Joe Nickell*

*Joe Nickell, formerly "Janus the Magician" and "Mendell the Mentalist," is CSICOP's Senior Research Fellow.*

### Note

Those who would like to contact Fox Television to comment on "Powers of the Paranormal," can e-mail Fox at askfox@foxinc.com or write to: "Powers of the Paranormal" Attn: FBC SPECIALS, Beverly Hills, CA 90213-0900, Attn: Bldg. 100, Room 4420.

## *Newsweek* Publishes Poll on Miracles

The May 1, 2000, issue of *Newsweek* featured an article on miracle claims ("What Miracles Mean" by Kenneth L. Woodward) that incorporated data from a *Newsweek* poll conducted by Princeton Survey Research Associates. Woodward touted broad belief in miracles among Americans of several religious persuasions. According to *Newsweek*, the poll showed that:

- 84 percent of Americans said that God performs miracles;
- 79 percent accept the accounts of miracles in the Bible as accurate;
- 72 percent said that "People who face death in accidents or natural disasters can be saved by a miracle"; and
- Two-thirds of Americans say that they have prayed for a miracle.

A few facts must be noted about this poll. Thirty-six percent of respondents identified themselves as evangelical Christians. As typical estimates place evangelicals to between roughly a quarter to a third of the US population, this group would seem slightly overrepresented. Also, this group answered "yes" to poll questions in much higher percentages than all other groups. Finally, the polling sample was small—752 adults—and allowed for an overall margin of error of +/-4 percent, and as wide a margin as +/-10 percent in the "Non-Christian" category—the group least likely to believe miracle claims. The value of this poll in gauging the American public's beliefs is questionable, and that makes it all the more frustrating that Woodward framed the results as what *adult Americans* believe.

Woodward discusses miracle claims as broadly accepted phenomena, interspersing his story with touching photos of people who claim miraculous cures. He sums up: "Miracles will always withhold their meaning from doubters and the merely credulous alike. . . . As an old Hasidic saying puts it, 'He who believes all these tales is a fool, but anyone who cannot believe them is a heretic.' For believer and skeptic alike, that is the paradox inherent in any religious faith." But stop the presses! Why is the skeptic mired in the paradoxes of religious faith? The burden of proof is on the one making the miracle claim, right?

While 84 percent of poll respondents answered "yes" when asked "Do you believe God performs miracles?" and 79 percent believe that the miracles in the Bible took place, only 48 percent responded "yes" when asked whether they have "personally ever experienced or witnessed what [they] consider to be a miracle." Remember: this number is spiked high by the 71-percent "yes" response rate of evangelical Christians.

If anything, this poll shows that people are most likely to believe in miracles as hearsay, and far less acquainted with miracles as a personal experience. The most credulous (evangelical Christians) are likely overrepresented and the sample of the least credulous group is particularly inadequate. All of this was hardly worth the time of *Newsweek*—or its readers.

*—Kevin Christopher*

*Kevin Christopher is CSICOP's Public Relations Director.* □

# Fund for the Future

CSICOP AT THE CENTER FOR INQUIRY

*CFI-International*
*Amherst, N.Y.*

## Promote CSICOP

**Using the Media & Telecommunications to Promote Science and Reason**

The Fund for the Future is a capital campaign to provide *CSICOP* with the resources needed to more effectively influence media and public opinion. The 90s were defined by a telecommunications revolution, along with an explosion of misinformation available to the scholar and citizen alike. The hunger for superstition, pseudoscience, the paranormal and miraculous solutions has never been more acute.

## The Ten-Year Plan

*CFI-Midwest*
*Kansas City, Mo.*

**Contributions are needed for current priorities:**

- Increased media appearances by skeptical spokespersons
- Press releases, opinion pieces and media alerts
- Greater exposure through the Internet, including webcasting
- National initiatives coordinated by the Council for Media Integrity
- Instructional materials introducing skepticism to elementary and secondary school students
- Video production

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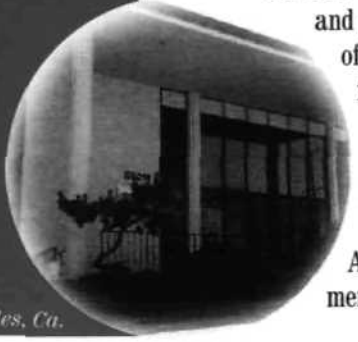

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*Los Angeles, Ca.*

CSICOP has established its expertise and integrity. It's time to command more media attention and a larger audience. The Center for Inquiry Fund for the Future is about new methods of outreach and broader influence, and is driven by an ambitious ten-year strategic plan for growth.

We depend on the support of readers and friends to continue leading the international skeptical movement. Gifts to the Fund for the Future provide the resources we need to respond to today's challenges.

All gifts are gratefully accepted. The Fund for the Future welcomes gifts of encouragement and major investments.

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*Bill Nye "The Science Guy," Joe Nickell, and entertainer Steve Allen appear on a radio show.*


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(716) 636-1425 ext. 311
Fax (716) 636-1733

*Co-chairs of the Fund for the Future Campaign: above, author and TV personality Steve Allen; below, author and critic Martin Gardner.*

## Council for Media Integrity

Formed just weeks after its inclusion in the Ten-Year Plan, the Council for Media Integrity monitors and challenges media programs that convey unfounded claims and mislead the public about science. Members include Steve Allen (co-chair), E. O. Wilson, Stephen Jay Gould, and many others. CSICOP will invest in electronic infrastructure to facilitate rapid response to irresponsible programs.

## Enhanced Library Resources

The Center for Inquiry's skeptics' library—already the finest of its kind in the world—needs additional funding to enlarge its core collection and add electronic media. Worldwide modem access to the library's catalog is already nearly complete.

## Adult Education

The Council cosponsors the Center for Inquiry Institute, which has already expanded its offerings to include a new three-year certificate program in science and skepticism. Courses are scheduled in Amherst, Los Angeles, and other cities.

## Regional Outreach

With the establishment of The Center for Inquiry–West (Los Angeles), The Center for Inquiry–Midwest (Kansas City) and The Center for Inquiry–Rockies (Boulder, Colorado), giant steps have been taken to enhance direct field service to skeptical activists. Additional regional centers are planned, with expanded calendars of activities.

## Focusing Upon the Young

To present the skeptical message more compellingly to the young, CSICOP will develop new materials—ranging from age-appropriate print publications to audio and video cassettes and instructional coursework. Goals include enhanced understanding of science and improved critical thinking skills.

# The New Paranatural Paradigm:

## *Special APS Session Examines Pseudoscience*

*The biggest physics meeting of the year featured a broad range of assessments from CSICOP panelists of pseudoscience and the paranormal in education, the media, and public perception.*

DONALD MAINFORT

When the American Physical Society held its meeting in Minneapolis March 20–24, 5,000 physicists presented the latest findings in areas like condensed matter physics, materials sciences, chemical physics, biological physics, fluid dynamics, polymer physics, and applied physics. The newsroom was abuzz about a chemist's report of his incredible DNA nanotechnology devices and news of other nanotechnology advancements in the self-assembly of periodic matter.

But there was something even a little more unusual at this APS meeting. A CSICOP panel presented a special session on the problems of pseudoscience, titled "*The Skeptical Inquirer* on the New Paranatural Paradigm." The interest was so great the session had to be moved to the convention center's 700-seat ballroom.

CSICOP founder and chairman Paul Kurtz, professor emeritus of philosophy at the State University of New York at Buffalo, opened the session, addressing what he calls the emerging "paranatural paradigm." This encompasses such ideas as beliefs in God, ghosts, angels and the design theory of "creation science"—none of which are a part of the natural world. But protagonists insist they have proof to substantiate their claims, so in response, Kurtz outlined how such life-after-death questions and "evidence" have been scrutinized for for more than 150 years—with no positive results. Beginning with the Fox sisters in 1848, all kinds of reports of apparitions, ghosts, rapping noises, table turnings, teleportation, levitation, and the summoning up of the dead at séances have been firmly laid to rest. All of these hoaxes were found to be nothing more remarkable or mysterious than the tapping of toe joints, feet, knees and other silly tricks.

In recent decades there has been a revival of interest in survival after death with reports of "channelers" (a new name for mediums) such as James Van Praagh, John Edwards, and Sylvia Browne who claim to communicate directly with the deceased. The mass media are saturated with uncritical psychic presentations, which have fueled a new revival of religion and spiritualism. Kurtz said independent corroboration is sorely lacking and all that remains are the eyewitness accounts, which have proven to be highly unreliable.

Science is advancing at an astonishing rate and yet much of the general populace, it appears, still chooses to abandon the natural in favor of the supernatural. Some of the terminology of the spiritualists has changed to satisfy current tastes, but the products remain the same. All of them, said Kurtz, seek to exploit the strong psychological denial that can often accompany the loss of a loved one.

Kurtz also reviewed recent claims made on behalf of near-death research. He said it was highly questionable that resuscitated patients meet discarnate persons on the other side. What is being described is the dying process; here naturalistic psychological and physiological causes more parsimoniously fit the data. Concluded Kurtz: "As far as we know, the death of the body entails the death of physiological functions, consciousness, and the personality, and there is no reason to believe that ghosts hover and communicate with us. I realize that this flies in the face of what the preponderance of humans wish to believe, but science should deal as best it can with what *is* the case, not with what we would like it to be."

*Donald Mainfort, who has lectured, taught English, and traveled extensively in China, now writes from Minneapolis.*

CSICOP's veteran investigator Joe Nickell, sporting an alien patterned necktie, took the audience on a whirlwind joyride through the history of UFOlogy. He gave a quick run-down of "flying saucer" mythology, and he showed a frame from the infamous "Alien Autopsy" film—introducing the fine specimen on the operating table as hailing "from the planet Latex." Among other discrepancies in the film, a sign on the wall in the background dated from the 1960s (the film was supposedly made in 1947). From there he discussed claims of people who say they have had contact with or been abducted by aliens.

As crazy as such stories might seem, Nickell said few alien abduction reports appear to be hoaxes. Most seem instead to come from "sincere, sane individuals." But after a pause he added that "not one has been authenticated, though" and he referred to paranormal explanations as "arguing from ignorance," where the lack of an explanation gives rise to the need to invent one.

The incubus and the succubus were ancient Greek demons that used their evil powers to suck the life from people while they slept. These demons may well have been the precursors to today's groping space aliens who are also reported to enjoy sneaking into our bedrooms at night. Past experience shows that some of these claims can in fact be the result of sleep-related phenomena (notably "waking dreams") and other psychological factors.

"As is typical of other mythologies, the alien myth involves supernormal beings that may interact with humans, and it purports to explain the workings of the universe and humanity's place within it," Nickell said. He ended with a reminder that these beliefs can be taken to a frightening level of absurdity, as seen in the Heaven's Gate mass suicide. But he cautioned that strange reports should not be dismissed out of hand. "They should be examined."

The old battle of science versus creationism still plagues the nation's public schools. Eugenie C. Scott, Executive Director of the National Center for Science Education, identifies the latest antievolution movement to emerge: Intelligent Design Creationism (IDC). IDC is another version of William Paley's 1801 "Argument from Design," which would have us believe that the unique structure and complexity of nature could never have been possible simply by "chance" (a major misunderstanding of the process of evolution). Offering examples from cell biology and biochemistry, they insist that the universe must have an all-powerful designer.

**The new cast of wizards and shamans have merely relabeled the previous, tired old routines: mediums are now called "channelers"; preachers now wish to be called scientists; and the bio-energetic force field has replaced the ether of Vitalism.**

Traditional antievolutionists such as the "Young Earth Creationists" (YECs) hold to a literal interpretation of the Bible: that the universe (including living things) was created in its present form and has not changed much since the "creation" that was written about in the Bible. To them, Earth is no more than 10,000 years old.

Unlike their YEC predecessors, the updated IDC's most prominent advocates are academics associated with secular universities, such as lawyer Phillip Johnson of UC-Berkeley and biochemist Michael Behe of Lehigh University. The novelty seems to be that academic credentials and respectable titles are used in an attempt to proselytize with greater authority.

"Like the YECs, the IDCs stress alleged 'weaknesses' in evolution more than positive evidence for their position and they propose that supernatural explanations substitute for and be labeled as science," said Scott. Although the most prominent IDCs are based at secular universities, she said they produce little in the way of refereed academic articles, though great quantities of popular materials are disseminated informally. IDC books have made their way into science, philosophy of science, and other nonscience courses where students may be confused and misled into thinking that evolution is only another form of belief.

Scott said the main problem for the IDC's is their failure to grasp the significance of *selection* in evolution. She advised that creationists wishing to claim any genuine scientific validation must first establish some way to test the predictions of creationism, and to do so by following the rules of science.

Physicist Victor J. Stenger is a well-published author on subjects relevant to the APS session (*Physics and Psychics, The Unconscious Quantum*). Long a professor of physics at University of Hawaii, Stenger concluded the session with an appropriate topic: *Paraphysics: Physics Misused and Misinterpreted.* Many physicists in the audience were eagerly waiting to hear one of their own address this issue.

Stenger showed examples of how quantum mechanics is often misinterpreted as implying the reality of extrasensory perception on the cosmic scale. Proponents of alternative medicine, for example, use the terms "energy" and "quantum" to suggest a scientific basis for "energy therapies" and mind-over-matter healing. Bio-energy field therapies such as therapeutic touch, acupuncture, and *qigong* are often justified with twisted arguments from quantum physics. In truth, he noted, there is no support for the notion that some "vital force," or other form of energy exists separate from matter. Stenger said

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these ancient beliefs had long been disproved, stressing that in modern physics, matter and energy are the same thing and therefore could never connect everything in the universe instantaneously. Quantum fields do not represent a continuous medium, or "ether." And no fields of any kind exist in theory or reality without particles, so continuous fields cannot exist.

"Mind and consciousness are not independent of matter. The brain is wired to the body, not to other bodies," he said. Stenger had the audience chuckling several times, as he briefly touched on some of the wackier attempts to misuse physics by such people as Deepak Chopra, Joan Stafantos, and physicist Paul Davies. One member of the audience complained that it is impossible to totally disprove the energy field theory. Perhaps it is there, he said, but we have not yet been able to detect it. Stenger reminded him that an extraordinary burden of proof falls on those who advance any claim that implies the overthrow of well-established scientific principles.

As the conference adjourned, one question remained: How can skeptics and scientists work to improve the image of science for the general public? American Institute of Physics press coordinator Phillip Schewe said that skeptical inquiry can sometimes be too heavy-handed, resulting in a backlash of sympathy for psychics and pseudoscientists. But APS director of public affairs Robert Park, himself an active investigator of pseudoscience (his book *Voodoo Science* is reviewed in this issue), had this to say on the matter: "I try always to avoid ridicule of nonscientists who are taken in by pseudoscientists. I see the much greater problem as scientists who are too timid or too busy to explain to the public that they are being misled. When the public is fooled, I blame us. But as for the pseudoscientists themselves, I see no reason at all to spare their feelings."

But some argue that certain pseudoscientists genuinely believe in what they are doing and are not intentionally committing fraud. What harm is there in humoring them? Park disagrees for this reason: "Pseudoscience after all is not merely bad science. It is an attempt to hijack the symbols and language of science for values that are not our values." Park's direct approach has resulted in the thorough debunking of such things as "Vitamin O" and "free energy."

The excitement of scientific discovery—like that found at this APS convention—must become more accessible to non-scientists. Participants repeatedly called for requiring technical writing courses for all graduate science students, and for more serious attention to the presentation of refereed articles. If scientists have trouble packaging information aimed at their peers, how can the public ever be expected to muddle through it? The University of Maryland is currently instituting a program of Science Communication for science graduate students. Lui Lam, professor of physics at San Jose State University, suggested the integration of popular science books into non-major physics courses to make the learning process more interesting and thus, sustainable for them. Several attendees praised Carl Sagan as a rare example of how the wonders of nature really can be presented in such a way as to compete successfully with the occult.

The findings of the CSICOP panel strongly indicate that, until further notice, there simply is no plausible evidence of extraterrestrial visitors, or of ghosts who intervene in our affairs, or of gods who might have designed the universe. The new cast of wizards and shamans have merely relabeled the previous, tired old routines: mediums are now called "channelers"; the incubus is now a highly intelligent alien with mystifying technology; preachers now wish to be called scientists; and the bioenergetic force field has replaced the ether of Vitalism. But, amidst all of the charlatans and the persistent media hype that is lavished upon them, we may all reasonably rest assured that the same fundamental laws of physics still apply—to everyone.

# Conference Examines Efficacy, Safety of Medicinal Herbs

DENISE GRADY

Chatting with the man who sat next to her on an airplane a year and a half ago, Dr. Leonore Arab could not help noticing that his skin had a telltale orange tinge. As they talked, he revealed that he was thirty-eight and had lung cancer, and in addition to undergoing standard treatment had consulted an "herbalist," who had told him to drink three glasses of carrot juice a day, eat little else, and take herbs and other supplements, including beta carotene, a yellowish-red nutrient that is converted into vitamin A in the body.

The carrot juice alone contained enough carotene to turn his skin orange, a harmless though certainly odd looking condition. But the herbalist's advice was not harmless. Indeed, Dr. Arab, a professor of epidemiology and nutrition at the University of North Carolina at Chapel Hill, found it troubling.

"It was heart-rending," she said, adding that she did not want to destroy his hopes, but felt an obligation to tell him that he might be harming himself.

She warned the man, as gently as possible, that research had linked beta carotene to an increased risk of lung cancer in men who smoked, and that the substance might not be safe for someone who already had lung cancer. In addition, she told him, cancer patients needed far more nourishment than they could get from a diet of carrots, juice, herbs, and vitamins.

That experience, and similar encounters with other patients taking herbal products with unknown ingredients and unknown effects, recommended by people with unknown credentials, led Dr. Arab to organize a scientific meeting on the subject.

The two-day conference, "The Efficacy and Safety of Medicinal Herbs," March 2–3 in Chapel Hill, North Carolina, was among the first in the nation to gather mainstream researchers from respected universities and to apply rigorous scientific standards to evaluating studies of herbal products. Duke University and the National Institutes of Health were cosponsors, along with the University of North Carolina.

But the scientific scrutiny is a bit late. "The train has left the station," Dr. Arab said, noting that Americans were already engaged in a vast, uncontrolled experiment. They spend $4 billion dollars a year on herbal remedies, which are not regulated by the Food and Drug Administration.

"People are not turning to health professionals," Dr. Arab said. "They go to magazines for information." Many do not even tell their doctors what they are taking.

But even if people did ask their doctors about herbs, most doctors could not answer. There is little information about herbs in the nation's scientific literature, and American medical schools do not teach students about them. Speakers at the conference included several researchers from Germany, where herbal medicines have been studied more extensively than in this country and are regulated like drugs by the government, which monitors growing, harvesting and processing.

Popular herbs got mixed reviews at the conference. More than twenty controlled studies of mild depression have shown that St. John's wort works as well as some prescription drugs, with fewer side effects. The herb is the best-selling antidepressant in Germany, and health

*Denise Grady is a reporter for* The New York Times, *where this article originally appeared. Reprinted by permission. Copyright © 2000,* The New York Times.

insurance covers it there as well as in Switzerland and Austria. It is also widely used by Americans who want to treat their own depression, but Dr. P. Murali Doraiswamy, a psychiatrist at Duke University who spoke at the conference, had reservations about it.

He said some of the studies were too small to be reliable, that long-term data were lacking, and that the herb had not been compared with the most effective prescription drugs like Prozac and Zoloft. Scientific reviewers called St. John's wort promising but unproven, he said, adding that many of his own patients had tried it, but often irregularly and at incorrect doses. Because depression is a serious illness and a major cause of suicide, he said the trend to self-medicate was worrisome.

Recently, cases have been reported in which St. John's wort has had dangerous interactions with other drugs, including those used to treat H.I.V. infection and to prevent rejection in transplant patients.

Several studies of St. John's wort are now in progress, one sponsored by the National Institutes of Health and one by Pfizer Inc., the drug company. In the meantime, Dr. Doraiswarny said, the jury is still out.

The herb saw palmetto, taken by many men to relieve symptoms of prostate enlargement like frequent urination, got a more positive report. Dr. Timothy J. Wilt, of the Veterans Affairs Center for Chronic Diseases in Minneapolis, evaluated eighteen studies and found that saw palmetto worked better than a placebo and as well as a prescription drug for the condition, finasteride, also called Proscar. The herb had fewer side effects and cost $15 a month, compared with $68 for the prescription drug. But Dr. Wilt said long-term studies were needed to find out whether saw palmetto would keep working and whether it might help men avoid or delay prostate surgery.

Ginseng does appear to have antioxidant properties, according to studies by Dr. David Kitts of the University of British Columbia in Vancouver. Antioxidants are thought to prevent certain types of cell damage associated with artery disease and aging, but their usefulness has not been proved and it is not clear whether they are safe for cancer patients, Dr. Arab said.

Another herb, comfrey, was condemned by Dr. Felix Stickel, of the University of Erlangen in Heidelberg who said the herb had been banned in Canada and Germany because it can cause liver failure. It has not been banned in the United States, though manufacturers have voluntarily removed it from products like herbal teas because its toxicity is widely known. Previously, it had been recommended both here and overseas to treat inflammation and constipation.

Other herbs received cautiously positive reviews. Dr. Arab reported that epidemiologic studies, in which researchers survey people's diets and health, indicated that eating cooked or raw garlic—but not garlic supplements —was linked to a decreased risk of stomach and intestinal cancer.

Dr. Edzard Ernst of the University of Exeter in England analyzed a series of studies of the herb feverfew, and concluded that it could be somewhat helpful in preventing, though not treating, migraine headaches.

Ginkgo biloba appeared to slow mental decline slightly in a third of patients in a placebo-controlled study of 137 people with dementia, Dr. Pierre LeBars of New York University said. The study, the first to show any benefit, was published in 1997 in *The Journal of the American Medical Association.* But the herb did not improve memory in healthy people. Dr. LeBars said more studies were needed to find out if it would really be of use in treating dementia. The form used in the study differed from the version usually sold in this country.

Certain echinacea extracts are accepted as treatment for colds in Germany, reported Dr. Rudolf Bauer of Heinrich-Heine University in Dusseldorf, who described several controlled studies showing that the herb could shorten the duration by a few days and ease symptoms. But there are three different species of echinacea and many different processing methods, and the effectiveness of different products may vary, he said, adding there was no evidence that any form of the herb could prevent colds or other infections.

Positive findings on herbs would be great news if Americans could obtain reliable products with known doses of substances that have medicinal effects. But what is actually in many of the items sold as dietary supplements in the United States is anybody's guess: some may actually contain none of what is promised on the label.

Dr. Varro E. Tyler, a distinguished professor emeritus of pharmacognosy at Purdue University, called the status of medicinal herbs in the United States a "scandalous situation" that has left the public bewildered, scratching their heads and trying to figure out things like which of a dozen different echinacea products might work. He also warned that anybody can call himself or herself an "herbalist" and offer all sorts of advice to the public.

Dr. Tyler, who has written more than thirty books about herbs, describes them as "dilute drugs," and he said they should be regulated as drugs by the FDA so that manufacturers are required to produce uniform batches with known ingredients.

But under the 1994 Dietary Supplement Health and Education Act, herbal medicines are classified as supplements, not drugs, which means there is no monitoring of quality control by a drug agency. The act also prevents manufacturers from saying on labels that their products can prevent or treat specific diseases or symptoms.

As a result, Dr. Tyler said the market has been flooded with "junk products" that are a waste of money. He denounced the growing trend to add herbs like St. John's wort and echinacea

to iced tea, soft drinks, and other foods. The herbs are drugs and should be treated with respect, he said, and do not belong in canned soup any more than Prozac does.

He faulted greedy manufacturers and the FDA. He said that to approve an herbal product as a drug, the federal agency insisted that its manufacturer provide the same proof of safety and efficacy as other new drugs. But that requirement is unrealistic, he said, because the testing process can cost hundreds of millions of dollars, and herb manufacturers do not attempt it, because their products are generally not patentable and they will never recoup the costs.

Since herbs have been around for so long and the vast majority have few or no side effects, Dr. Tyler said the rules should be relaxed for them, to require strong proof of safety and "reasonable" proof of efficacy, which he said could be obtained with two well-designed, placebo-controlled trials that would cost a few million dollars, instead of hundreds of millions. He predicted that FDA-approved herbal drugs would be so popular that people would flock to them, forcing manufacturers to submit to the process to be competitive.

But a spokeswoman for the drug agency said that changing the standards for approval would take an act of Congress. □


# The Third International Skeptics Convention

## November 9–12 • Sydney, Australia

**Jointly hosted by the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) and Australian Skeptics Inc.**

**SPEAKERS**

Invitations to participate in the convention have been issued to a number of prominent skeptical speakers from the USA, UK, New Zealand and India, as well as from around Australia. Among those who have already accepted our invitation to speak at this convention are:

**USA**

- Prof. Paul Kurtz
- Joe Nickell
- Bob Steiner

**UK**

- Dr. Richard Wiseman

**AUSTRALIA**

- Prof. Mike Archer
- Prof. Simon Chapman
- Dr. Geoffrey Dean
- Prof. John Dwyer
- Prof. Macieg Henneberg
- Prof. Ray Lowenthal
- Prof. Ian Plimer
- Rosemary Stanton

The convention will focus on three important human concerns that skeptics recognize as making paranormal, pseudoscientific and other irrational claims so attractive to so many people: Health, Wealth and Wellbeing. Therefore the convention will be divided into three main themes, with one day to each theme.

**WELLBEING THROUGH CRITICAL THINKING**

The key to wellbeing in a complex society is the ability to think critically. On Saturday, November 11, this topic will be addressed by an expert panel of scientists, philosophers and skeptics from around the world who will look critically at the wide range of issues that confront us as skeptics.

**HEALTH**

The twentieth century is when the practice of medicine truly became scientific for the first time, but as we approach the twenty-first century we see an increase in support for unsubstantiated hold-overs from an earlier age. On Sunday, November 12 we will hear from a distinguished panel of international speakers who will address what this means for our health as individuals and as a society. And it will not be confined to human health. One field in which dubious alternative treatments is making serious inroads is in veterinary medicine, and this area will also be addressed.

**OTHER SESSIONS**

As well as the main program in the Wallace Theatre, each afternoon we will be conducting concurrent speaking sessions on skeptical related topics in separate rooms nearby. Subscribers are invited to offer abstracts of papers they would like to present during these sessions. We cannot guarantee that everyone will be presented, so we ask that you send us your suggestions as soon as possible.

As well we are hoping to make available a number of display booths in which skeptics groups can show off their own particular areas of interest, and other organizations, such as publishers, regulatory authorities, etc., can offer their products and services.

Our aim is to use this convention to spread the word that to be a skeptic is not to be a negative naysayer, but to be a positive influence for improving our society. As well as being instructive we also intend that the meeting will be entertaining and we will ensure that the element of fun will be prominent among our objectives.

**For further details contact: Australian Skeptics PO Box 268 • Roseville NSW 2069 • Australia**
**Ph 612-9417-2071 • Fax 612-9417-7930 • E-mail: skeptics@kasm.com.au. World Convention Web site (under construction): www.geocities.com/skeptics2000 • Aust Skeptics Web site: www.skeptics.com.au**

# Krakatene: The Name is Just Fine, But It Can't Be $C_6$

*Explosive pseudoscience from the Czech Academy of Sciences*

ZDENĚK SLANINA

The Czech republic has a long tradition in explosives engineering, and the infamous "Semtex" (supposedly hexahydro-1,3,5-trinitro-1,3,5-triazine, though it is still a secret and other sources speak of penterythritol tetranitrate) is a good example of the tradition. Its name is derived from a village, Semtín, where the firm Synthesia is located. The university in the nearby town of Pardubice has a department specializing in explosives; this is unusual at a university. Consequently, when a respected senior scholar from the Czech Academy of Sciences in Prague (who has no link to Pardubice or Semtín) announces in a major newspaper interview[1]: "We discovered . . . a compound which is . . . the strongest classical explosive known so far. It is one hundred times, possibly even one thousand times, stronger than trinitrotoluene, dynamite, or nitroglycerin" one should pay attention. This is especially true if the announcement is backed by the Academy. But the Czech army, navy, and air force showed no interest, not because the Cold War is over but because the armed services are paid for real accomplishments, not just for plays on words. What went wrong?

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The play on words was really impressive in this case. The discoverer named the new species Krakatene/Cracatene (in an obvious reference to the volcano Krakatoa or Krakatau, whose eruption in 1883 is considered to be the most destructive in recorded history). He had no experimental support for his claim, which was based solely on theoretical speculation. The formula of the species is $C_6$. The discoverer gave only one argument in support of the claim that the substance explodes: "A ring of six carbon atoms is very rich in energy. We say that we have a compound with a very large positive heat of formation."

Small carbon clusters are not new. Otto Hahn and his coworkers reported clusters up to $C_{15}$ as early as 1942–1943. They have been considered as a component of the mechanism of formation of $C_{60}$ (fullerenes) and of soot. They have been characterized spectrally to some extent; they can be linear, cyclic, or even nonplanar. Extensive theoretical calculations have been done on them, but they were never prepared in macroscopic amounts as condensed-phase chemical species. It is also known that $C_4$, $C_3$, $C_2$, and even $C_1$ have heats of formation in the ideal gas phase at room temperature which are greater per carbon atom than that of $C_6$. Does this mean that one should call them krakatene-4, krakatene-3, krakatene-2 or krakatene-1?

The heat of formation is a very useful quantity as it permits evaluation of the heat of reaction of any chemical process. However, it is a variable term which depends on the definitions of reference states. A stable species does not necessarily have a negative heat of formation (e.g., liquid benzene, +49 kJ/mol) but it may (liquid hexafluorobenzene, -991 kJ/mol). If you invest extra labor you can redefine the reference states and change the signs at will (however, you would create confusion in the useful data). If we are bold enough and look at the notorious explosives we shall find that the heats of formation may be positive or negative.

Liquid nitroglycerin is perfectly all right with a value of -371 kJ/mol (and doesn't seem to care that it has a large negative heat of formation), but TNT jumps to +44 kJ/mol (another source gives a value of -75 kJ/mol for solid TNT). Moreover, nitroglycerin creates almost twice as large a cavity in a standard lead block test of explosive strength as the same mass of TNT.

In fact, energy contents are not good predictors of explosive strength. Conventional explosives have a lower energy output, by one order of magnitude, than common fuels. The detonation of nitroglycerin yields about 6 kJ/g. (Usually, explosives do not need atmospheric oxygen; i.e., explosion stoichiometry is not identical with that of combustion. However, the combustion of nitroglycerin yields a similar amount of energy.) Burning one gram of graphite or gasoline gives 33 and 47 kJ, respectively. Still, no one tries to use coal in place of dynamite, though porous charcoal with liquid oxygen or simply coal dust would work. However, the energy produced is essentially the same in all the three carbon species.

What really matters are kinetics and reaction rates; the energy and hot gases must be released in a relatively short time. Indeed, the time for complete reaction is shorter in explosions, by five orders of magnitude, than in the burning of fuel. Therefore, pressures developed are higher by four to six orders of magnitude. Hence, if someone tries to "invent" new explosives using pencil and paper, he/she should estimate reaction rates, not heats of formation! All this is certainly not new: C.N. Hinshelwood and N.N. Semenov received the Nobel prize for such work in 1956, and they explained the kinetics of some explosions as early as the 1920s and 1930s.

But even before we discuss any kinetics, and before we ask what the expanding gases are in the Krakatene case, we have to realize that potential explosives must be stable under ordinary conditions in order to be fabricated, stored, transported or even smuggled, and they should explode only upon activation. It must be possible to produce it readily in large quantities. This is certainly a basic requirement, but $C_6$ can only be prepared in small amounts in the gas phase or on inert-gas matrices. There are two stability domains for carbon clusters: $C_{60}$ and some larger aggregates, and soot. We certainly do not know all the thermodynamic and kinetic details of the complex system but we do know what the final products are.

Not everybody cooks fullerenes in an oven. Consider a system as trivial and innocent as $N_2$, and let us consider a higher excited electronic state of it, say a quintet located some 900 kJ/mol above the ground state. The heat of formation of $N_2$ is zero by definition, and the quintet has its heat of formation 900 kJ/mol or about 33 kJ/g. This is considerably higher than the assumed heat of formation of $C_6$. Now, you could raise your voice, wave your hands dramatically or jump happily—Super-Krakatene! Hardly any chemist would pay attention to the hand-waving arguments, since we cannot produce the quintet in large amounts or store it for a long time. Therefore, there is no need to bother with the kinetics of the energy release from the quintet back to the ground state.

Last, but not least, it is virtually impossible to publish such a polemic within the Czech scientific community. People are afraid that it would further lower the shaky image of science in the eyes of the general public. (This is supposedly a reason why the Semtín/Pardubice people never publicly commented on the Krakatene story.) Nevertheless, science is, in one way or another, a self-correcting institution, and this is its vital feature. Let us, finally, quote J.P. Joule, who apparently anticipated that people would have problems with work-heat conversions for decades, if not centuries, to come and stated it as an error-dissipation law: *"The way to make no errors is to write no papers."*


## Acknowledgement

The author appreciates the kind hospitality of the Limburgs Universitair Centrum, where this article was written, and valuable discussions with scholars from the University of Pardubice (who wish not to be named). The author also acknowledges a partial support from the Alexander von Humboldt-Stiftung and the Max-Planck-Institut für Chemie (Otto-Hahn-Institut).


## Note

1. A partial bibliography of the Krakatene/Cracatene explosive discovery: Young Front (March 20, 1993); J. Mol. Struct. (Theochem) 313 (1994) 335, esp. p. 341; THEOCHEM—J. Mol. Struct. 119 (1994) 335, esp. p. 341; Chem. Listy 86, 162 (1992), esp. p. 164; General Chemistry, Karolinum (1994), esp. p. 211. □


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# David Bohm and Jiddo Krishnamurti

My previous column was about the guided wave theory of David Bohm, and its growing acceptance by many of today's quantum theorists. In this issue I will sketch Bohm's sad life and his strange relationship with the Indian guru Jiddo Krishnamurti.

Bohm was born in Wilkes-Barre, Pennsylvania, in 1917. When he obtained his doctorate in physics under J. Robert Oppenheimer, at the University of California, Berkeley, Bohm was a dedicated Marxist and a strong admirer of Lenin, Stalin, and the Soviet system. These opinions drew the fire of Senator Joseph McCarthy. Bohm's refusal to name names resulted in his indictment for contempt of Congress. Princeton University, which had hired him, let him go. No other university in America wanted him. After brief periods of teaching in Brazil, Israel, and England, he finally became a professor at London's Birkbeck College where he remained until he retired.

As Bohm grew older, he became increasingly preoccupied with Eastern mysticism and parapsychology. The Indian philosopher Krishnamurti became a good friend. The "All is One" aspect of Buddhism and Hinduism, and the pantheism of Hegel and Alfred North Whitehead, strongly influenced Bohm's view of the universe. He became convinced that being is multidimensional, with infinite levels in both directions—levels far beyond our comprehension. On Newton's level the universe is deterministic and mind independent. On the quantum level it rests on uncertainty and chance, with tinges of solipsism. Below the quantum level, Bohm believed, is a subquantum world in which determinism and reality return. And below that? The levels are endless. Ultimate truths are forever beyond our grasp. I do not know whether Bohm believed in reincarnation or personified the Unknowable as the Hindu god Brahman, the ultimate ground of being about whom nothing can be said.

"If Bohm's physics, or one similar to it," Gary Zukav writes in his popular New Age book *The Dancing Wu Li Masters* (1979), "should become the main thrust of physics in the future, the dances of East and West could blend in exquisite harmony. Do not be surprised if physics curricula of the twenty-first century include classes in meditation."

For another typical example of how occult journalists have latched onto Bohm, see Michael Talbot's *The Holographic Universe* (1991). Talbot buys just about everything on the paranormal landscape including palmistry, UFOs, poltergeists, and dermo-optical perception—the ability to see with fingers, nose, and armpits. His book's main theme is that Bohm's quantum potential field accounts for all paranormal wonders. Curiously, Talbot doesn't mention astrology, even though Bohm's quantum potential might offer a good basis for it.

Bohm's disenchantment with Soviet Communism did not come until 1956 when Nikita Krushchev delivered his blistering attack on Stalin, and the magnitude of Stalin's purges and the slave labor camps became widely known. It was a crushing blow that plunged Bohm into the second of his periodic depressions. (The first began when he was 26, and lasted two years.) For six months Bohm underwent intensive Freudian psychoanalysis before this second depression lifted.

Ex-Communists and fellow travelers have a habit of turning from Marxism to another ideology, often Catholicism or some other religion. In Bohm's case it was a bounce toward Buddhism and Hinduism, and the teachings of Krishnamurti. After decades of close friendship, with unbounded admiration largely on Bohm's side, the two had a bitter falling out. Krishnamurti always had a low opinion of physics, and Bohm's pilot wave theory in particular. He had a cruel way of treating Bohm as if he were a stupid child unable to fully appreciate his (Krishnamurti's) vast wisdom.

Krishnamurti (1895–1986) was one of the most peculiar gurus ever to come

*Martin Gardner's two-volume* Annotated Alice *has recently been reprinted in a one-volume edition.*

out of Mother India. In 1908, this thin, frail, shy lad, of Brahmin birth, was discovered by Annie Besant and Charles Leadbeater, the most famous disciples of Madame Blavatsky. They became convinced that young Jiddo was the new messiah, or world teacher, and the incarnation of Lord Bodhisattva Maitreya, the fifth Buddha. Leadbeater, who claimed to be clairvoyant, saw all this when he viewed Jiddo's aura. Besant adopted him as her son and raised him as a theosophist. In 1910, Krishnamurti's first book, *At the Feet of the Master*, was published by England's Theosophical Society. It was said to have been written by Krishnamurti who used the pseudonym of Alcyone, when he was 15.

In 1911, Besant, then the international president of the Theosophical Society, founded the Order of the Star of the East. Krishnamurti was the rising Star. In 1922 Annie purchased six acres in Ojai, California, where Krishnamurti eventually settled, and which became the headquarters of the still-flourishing Krishnamurti Foundation.

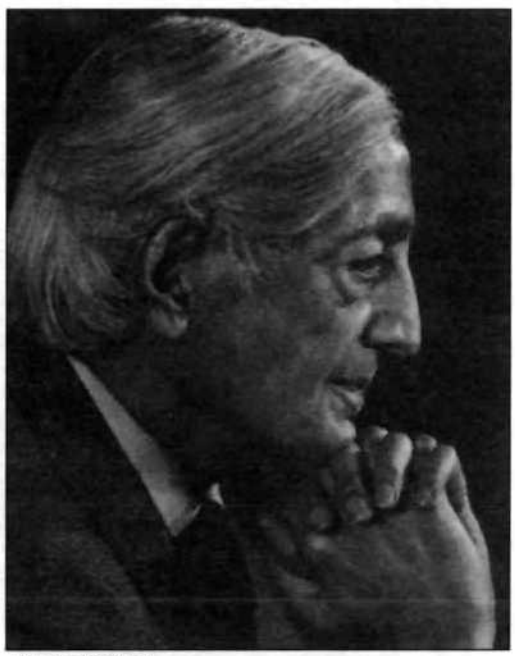
Jiddo's father lost a lawsuit trying to regain custody of his son. His lawsuit accused Leadbeater, who was probably gay, of having had sexual relations with Jiddo.

In 1922 Krishnamurti had a spiritual awakening which *Harper's Encyclopedia of Mystical and Paranormal Experience*, edited by Rosemary Ellen Gulley, describes as follows:

> He suffered excruciating headaches, visions, and convulsions, shuddering and moaning, and semiconsciousness, much as a person possessed. These seizures and spiritual manifestations lasted for several years and formed the basis for Krishnamurti's later orientation. He called the ordeal "an inward cleansing."

Krishnamurti tried to enter Oxford, but failed its entrance examination. He never got a college degree. In 1929 he made a cleansing break with his theosophical upbringing by disbanding the Order of the Star. A year later, to Annie Besant's sorrow, he resigned from the Theosophical Society. Henceforth he would travel around the globe, giving talks and conducting dialogues in which he taught a vague form of consciousness raising unrelated to any religion, and based on his own techniques of meditation and self-improvement.

As Bohm's friend and collaborator David Peat tells it in his biography of Bohm, *Infinite Potential* (1997), young Krishnamurti actually believed for a time that he was indeed the incarnation of Lord Maitveya, and the true successor to Jesus. His consciousness and that of Maitveya had merged; the "beloved" spoke through him. Although Krishnamurti outgrew the theosophical nonsense Besant and Leadbeater had drummed into him, he never stopped believing that he and he alone among living mortals knew the truth about everything. His teaching was a mix of dull platitudes and murky phrases such as "the observer is the observed," "thinking is the thought," "choiceless awareness," and that to be transformed one must "die to the moment." He was convinced that when a person was radically changed through proper meditation there were actual mutations in the brain!



Jiddo Krishnamurti

Krishnamurti's name was on more than forty books, as well as on endless audio and video tapes. *The Ending of Time* (1985) was a book coauthored with Bohm. I have done my best to try to read some of these books without falling asleep. It is hard to understand how the author of such vapid ideas could have mesmerized listeners, most of them women, when he lectured, and to have captured the admiration of a great physicist. His lines are like those in Lewis Carroll's "Jabberwocky." As Alice remarked, they seem to mean something, but it's hard to pin down just what. There is never a hint in Krishnamurti's writings of a personal God or the survival of personality after death. He almost never refers to or quotes from any other thinker. His vision is a kind of watered-down Buddhism in which the key message is that everything is interconnected, and one must live in the moment, without fear, and accept everything that happens with resignation and tranquility. The same infuriating vagueness permeates books written by his admirers.

To give you a glimpse into Krishnamurti's vagueness, here are a few typical excerpts from his talks:

> . . . There is no such thing as doing right or wrong when there is freedom. You *are* free and from that centre you act. And hence there is no fear, and a mind that has no fear is capable of great love. And when there is love it can do what it will.

> Death is a renewal, a mutation, in which thought does not function at all because thought is old. When there is death there is something totally new. Freedom from the known is death, and then you are living.

> When you love, is there an observer? There is an observer only when love is desire and pleasure. When desire and pleasure are not associated with love, then love is intense. It is, like beauty, something totally new every day. As I have said, it has no yesterday and no tomorrow.

> As long as there is a time interval between the observer and the observed it creates friction and therefore there is a waste of energy. That energy is gathered to its highest point when the observer is the observed, in which there is no time interval at all. Then there will be energy without motive and it will find its own channel of action because then the "I" does not exist.

> To see what you actually are without any comparison gives you tremendous energy to look. When you can look at yourself without comparison you are beyond comparison, which does not mean that the mind is stagnant with contentment.
>
> You can face a fact only in the present and if you never allow it to be present because you are always escaping from it, you can never face it, and because we have cultivated a whole network of escapes we are caught in the habit of escape.
>
> We might be able to modify ourselves slightly, live a little more quietly with a little more affection, but in itself it will not give total perception. But I must know how to analyse which means that in the process of analysis my mind becomes extraordinarily sharp, and it is that quality of sharpness, of attention, of seriousness, which will give total perception. One hasn't the eyes to see the whole thing at a glance; this clarity of the eye is possible only if one can see the details, *then jump.*

It was not just Bohm who fell under the sway of Krishnamurti's charisma. He strongly influenced such writers as Joseph Campbell, the poet Robinson Jeffers, Henry Miller, Aldous Huxley, and Alan Watts who churned out popular books about Zen Buddhism. George Bernard Shaw once called young Krishnamurti "the most beautiful human being" he ever saw. After visiting Krishnamurti's castle in Holland, Campbell wrote in a letter: "I can scarcely think of anything but the wisdom and beauty of my friend." In another letter he said, "Every time I talk with Krishna, something new amazes me."

There were two Krishnamurtis. One was the persona presented to the world through lectures and books; a man without ego who led a sanctified life of celibacy and high moral purity. The other Krishnamurti was a shadowy, self-centered, vain man, capable of sudden angers and enormous cruelty to friends. He was also a habitual liar. Krishna, as his friends called him, freely admitted his compulsive lying. He blamed it on simple fear of having his deceptions detected.

Krishna's closest associate was Raja, whose full Indian name was Desikacharya Rajagopalacharya. A native of India, Raja was as handsome as Krishna, and for almost thirty years a devoted disciple who served as his master's business manager, secretary, literary agent, and editor. It was Krishna's good friend Aldous Huxley who introduced Raja to his editor at Harper and Row, the firm that published Krishna's many books. Krishna had little interest in writing or publishing, but he allowed Raja to cobble books out of his talks and notebooks, and to edit this material into volumes.

A young Krishnamurti with Annie Besant.

Raja's wife Rosalind was a beautiful American Caucasian who grew up in Hollywood, a friend of movie stars, who almost became a professional tennis player. Toward the end of Krishna's life an astonishing revelation came to light. For nearly thirty years, unknown to Raja, Rosalind had been Krishna's mistress! As such, she had undergone a miscarriage and several abortions, all miraculously kept secret from her husband.

Raja forgave his wife and never ceased loving her, but a rift between Raja and Krishna grew steadily wider until finally they became bitter enemies. Twice Krishna unsuccessfully sued Raja for mishandling funds, and Raja in turn sued Krishna for slander. All three lawsuits were finally settled out of court. The two former friends never reconciled.

Rosalind's passion for Krishna cooled when she discovered he was having another secret affair, this time with a shy, beautiful young woman, Nandini Mehta. Raja's passion for Rosalind also dimmed when he fell in love with Annalisa Begha, a Swiss-Italian who was twenty-three years his junior. After he and Rosalind finally obtained a Mexican divorce, Raja and Annalisa married.

You can learn all the sordid details about these surprising events in a splendid biography of Krishna, *Lives in the Shadow with J. Krishnamurti* (1991), by Radha Rajagopal Sloss, the daughter of Rosalind and Raja. Now married to mathematician James Sloss, a professor at the University of California, Santa Barbara, Radha is also the author of *India Beyond the Mirror* (1988).

A story in Mrs. Sloss's book reveals how little Krishnamurti understood science. America's funniest and nuttiest medical quack was Dr. Albert Abrams. You can read about him in my *Fads and Fallacies.* Abrams invented a bizarre electrical machine which he claimed could diagnose all ailments from a drop of blood, and could cure terrible diseases by electrical rays. Like the writer and socialist Upton Sinclair, Krishna became convinced that Abrams's machine did everything he claimed it did. He sent Abrams a blood sample, and was told he had cancer in his intestines and left lung, and syphilis in his spine and nose. After being treated for a while by Abrams's machine, Krishna said he felt much better.

Radha likens her father to the Hindu god Vishnu, the preserver, and Krishna to Shiva, the destroyer. "The division between Krishnamurti himself will cast a very dark shadow on all he has said or written," Radha concludes. "Because the first thing the readers will say, is: 'If he cannot live it, who can?'"

After learning about Krishnamurti's secret love affair with his best friend's wife, Bohm felt betrayed. Perhaps this plunged him into his third and final deep depression. Hospitalized, suffering from paranoia and thoughts of suicide, Bohm underwent fourteen episodes of shock therapy before he recovered sufficiently to leave the mental hospital. Earlier triple bypass surgery on his heart had been successful, but his death in 1991, at age 75, was from a massive heart attack. Krishnamurti had died six years earlier, at his home in Ojai, of pancreatic cancer. His body was cremated.

Bohm's creative work in physics is undisputable, but in other fields he was almost as gullible as Conan Doyle. He was favorably impressed by Count Alfred Korzybski's *Science and Sanity*, with the morphogenic fields of Rupert Sheldrake, the orgone energy of Wilhelm Reich, and the marvels of parapsychology.[1] For a while he took seriously Uri Geller's ability to bend keys and spoons, to move compasses, and produce clicks in a Geiger counter, all with his mind.

Bohm also flirted with panpsychism, the belief that all matter is in some sense alive with low levels of consciousness. "Even the electron is informed with a certain level of mind," Bohm said in an interview published in *Quantum Implications: Essays in Honor of David Bohm* (1987), edited by Basil Hiley and David Peat. Bohm's later writings swarm with neologisms such as *holomovement*, *rheomode*, *levate*, *enfoldment*, *soma-significant*, and *implicate and explicate levels of reality*.

In his biography of Bohm, David Peat tells how Bohm carried with him a key bent by Uri Geller as if it were a holy relic. When the key later disappeared, Bohm took this to be Geller's psychokinetic powers at work from a distance. When the key was found an hour later, he believed this to be another paranormal event! Bohm's close associate Basil Hiley at once recognized Geller as a charlatan. He often warned Bohm that if he appeared to endorse Geller it would damage their work. Bohm agreed to back away from Geller. As Hiley said to Peat, Bohm often had to be saved from idiots.

Bohm's Eastern metaphysics, even though it helped shape his interpretation of quantum mechanics, should not be held against the potential fruitfulness of his pilot wave theory. In a similar fashion Isaac Newton's Biblical fundamentalism and his alchemical research cast no shadows over his contributions to physics. Nor did Kepler's belief in astrology throw doubts on his great discoveries.

Einstein once said that his misgivings about the Copenhagen interpretation of QM came from something he felt in his little finger. For decades his intuitions were ridiculed by Bohr and his followers. They never ceased to express sorrow over how the great man had deserted them by refusing, in his senior years, to view QM as a beautiful, complete theory, in no need of being replaced or modified.

It is too bad that Einstein did not live to see an increasing number of top physicists, such as Roger Penrose, Jeffrey Bub, and John Bell, who suspected, and today suspect, that the old maestro may turn out to be right after all.

## Note

1. Sheldrake's latest book, published by Crown in 1999, is titled *Dogs That Know When Their Owners Are Coming Home And Other Unexplained Powers of Animals*. The other animals with psychic powers include cats, parrots, horses, monkeys, sheep, pigs, rabbits, and even chickens! On Sheldrake's earlier bizarre claims, see Chapter 15 in my 1988 collection of *SI* columns, *The New Age: Notes of a Fringe Watcher*. □

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# Stigmata: In Imitation of Christ

Of reputed miraculous powers, perhaps none is more popularly equated with saintliness than stigmata, the wounds of Christ's crucifixion allegedly duplicated spontaneously upon the body of a Christian. Indeed one historical survey indicated that about a fifth of all stigmatics are eventually beatified or canonized (Biot 1962, 23).

The year 1999 brought renewed interest in the alleged phenomenon. Among the offerings were the movie *Stigmata* (which even contained a brief shot of my book, *Looking for a Miracle* [Radford 1999]); a Fox television pseudodocumentary, *Signs from God*, which featured a major segment on stigmata (Willesee 1999); and the Vatican's beatification of the Italian stigmatic Padre Pio (*CNN & Time* 1999). For an in-progress television documentary, I took a new look at the subject.

## Evolving Phenomenon

From the death of Jesus, about A.D. 29 or 30, nearly twelve centuries would pass before stigmata began to appear—unless one counts a cryptic Biblical reference by St. Paul. In Galatians 6:17 he wrote, "I bear in my body the marks of the Lord Jesus." Many scholars believe Paul was speaking figuratively, but in any case the statement may have been sufficient to prompt imitation.

St. Francis of Assisi (1182–1226) is credited with being the first stigmatic—or at least the first "true" one, his affliction occurring just two years after that of a man from Oxford who had exhibited the five crucifixion wounds in 1222. That man claimed to be the son of God and the redeemer of mankind, but he was arrested for imposture, his wounds presumed to have been self-inflicted.

In 1224 St. Francis went with some of his "disciples" up Mount Alverno in the Apennines. After forty days of fasting and prayer he had a vision of Christ on the cross, whereafter he received the four nail wounds and a pierced side. Francis appears to have sparked a copycat phenomenon, since publication of his reputed miracle was followed by occurrences of stigmata "even among people who were much lower than St. Francis in religious stature, and have continued to occur without intermission ever since," according to Catholic scholar Herbert Thurston (1952, 122–123). He continues:

> What I infer is that the example of St. Francis created what I have called the "crucifixion complex." Once it had been brought home to contemplatives that it was possible to be physically conformed to the sufferings of Christ by bearing His wound-marks in the hands, feet and side, then the idea of this form of union with their Divine Master took shape in the minds of many. It became in fact a pious obsession; so much so that in a few exceptionally sensitive individuals the idea conceived in the mind was realized in the flesh.

Thurston believed stigmatization was due to the effects of suggestion, but experimental attempts to duplicate the phenomenon, for example by using hypnosis, have been unsuccessful—except for a related case which appears to have been a hoax. (The psychiatrist reported that bloody tears welled inside the subject's eyelids, but a photograph shows rivulets *originating outside* the eyes [see Wilson 1988].)

As the thirteenth century advanced, exhibitions of stigmata began to proliferate, one authority regarding it as "a sort of explosion" (Biot 1962, 18). Within a hundred years of St. Francis's death over twenty cases had occurred. The trend continued in successive centuries, with no fewer than 321 stigmatics being recorded by 1908. Not only were they invariably Catholic, but more than a third had come from Italy and the rest mostly from France, Spain, and Portugal, demonstrating that "the Roman Catholic countries, mostly with a Latin and Mediterranean influence have dominated the history of stigmata" (Harrison 1994, 9; Wilson 1988, 10).

The twentieth-century record of stigmata, however, "shows a change in pattern." Italy dominated somewhat less, and cases were reported from Great Britain, Australia, and the United States (Harrison 1994, 9). The latter included (in 1972) a ten-year-old African-American girl named Cloretta Robinson,

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a Baptist and thus one of a very few non-Catholic Christians to have exhibited the stigmata (including at least three Anglicans; Harrison 1994, 9, 87).

Other evidence that stigmata represent an evolving phenomenon comes from the form of the wounds. Interestingly, those of St. Francis (except for the wound in his side) "were not wounds which bled but impressions of the heads of the nails, round and black and standing clear from the flesh" (Harrison 1994, 25). Since then, although bleeding wounds have been typical they have been exceedingly varied, showing "no consistency even remotely suggesting them as replications of one single, original pattern" (Wilson 1988, 63). For example, some wounds have been tiny, straight slits, others simple crosses, multiple slash marks, or indentations—even, in the case of Therese Neumann, shifting from round to rectangular over time, presumably as she learned the true shape of Roman nails. In some instances there were no apparent lesions beneath the seepages (or possibly fake applications!) of blood (Wilson 1988, 64; Harrison 1994, 70; Nickell 1999).

Similarly, the wound in the side (representing the Roman soldier's lance [John 19:34]) has appeared at different locations in the right or left side, or has been variously shaped—as a lateral slit, crescent, cross, etc.—or has not appeared at all. Some stigmatics have exhibited wounds on the forehead (as if caused by a crown of thorns [John 19:2]), markings on the back (representing scourging [John 19:1]), or abrasions on the shoulder (as from carrying a cross), and so on, while others have not exhibited these. There are even symbolic markings, such as "a vivid cross" that twice appeared on the forehead of stigmatist Heather Woods (a phenomenon previously experienced by seventeenth-century stigmatic Jeanne des Anges). And stigmata-like skin lettering—including the names of Joseph, Mary, and Jesus—appeared and reappeared on the left hand of Jeanne des Anges (1602–1665) (Wilson 1988, 64, 131–148; Harrison 1994, 2, 52).

Another trend in the evolving phenomenon—represented for example by Virginia priest James Bruse—is the location of nail wounds in the wrists. Others have tended to have them in the palms of the hands, so Bruse's wrist marks seem instructive. As Harrison observes (1994, 40), stigmata in the wrists have appeared only since photography "revealed the wounds so positioned in the Turin Shroud." Actually, while the hands of the figure on the shroud are folded so that a single, exit wound shows, it seems to indicate the palm, although the flow of "blood" does extend to the wrist, thus giving the appearance of the wound being located there (Nickell 1983). Those who believe the shroud authentic (despite definitive scientific proof to the contrary [Nickell 1998]) have an interest in promoting the wrist site. They point to experiments with cadavers that supposedly show nailed hands could not support the weight of a body and would therefore tear away (Barbet 1950). (Skeletal remains have been discovered of only a single first-century crucifixion victim, a man known as Jehohanan. A scratch on the lower end of the right radius suggests a nail had penetrated between the radius and ulna. Interestingly, a nail had been driven through the heel bones from the side, indicating that Jehohanan had been forced into "a sort of sidesaddle position," quite unlike the familiar depiction of Jesus in Christian art [Wilson 1979, 50, illus. fol. p. 128].)

Figure 1. Cross-shaped wound on back of Katya Rivas's left hand.

In any event, if it is true that the hand location is anatomically untenable—notwithstanding the gospels (John 20:25–27 and Luke 24:40)—the argument could be made that all stigmata in the hands are therefore false, a judgment that would exclude most reported instances. Certainly the shift of location to the wrists (in keeping with a modern view) is not surprising. Stigmatics in the Middle Ages likewise "produced wounds in themselves which corresponded to the pictures of Christ suffering around them" (Harrison 1994, 128). Similarly, the 1974 crucifixion vision of Ethel Chapman, during which her stigmata allegedly appeared, was "based on the images in an illustrated Bible which she'd been given" (Harrison 1994, 128; Wilson 1988, 147). Such strong connections between popular images and the nature of the stigmata are powerful evidence that the phenomenon is imitative.

## Stigmatic Profile

A look at stigmata as an evolving phenomenon also sheds light on the people involved. The previously mentioned census of 321 stigmatics reveals "an interesting seven-to-one proportion of women to men." Not only were almost all Roman Catholics, but "a very high proportion were cloistered priests or nuns"—as was, of course, the first stigmatic, St. Francis, and such thirteenth-century stigmatics as the Blessed Helen of Veszprim (1237); St. Christina of Stommeln (1268); and others (Harrison 1994, 10, 27–28; Wilson 1988, 131–133). Indeed, of the 321 stigmatics, 109 came from the Dominican Order and 102 from the Franciscans—an overall percentage of 66 percent from religious orders versus 34 percent layfolk (Biot 1962, 20).

Many stigmatics seem—also like St. Francis—to have had an early life that might be characterized as notably "worldly," before coming to believe they had been called to serve God. As a youth, Francis, the son of a wealthy merchant, was "gay, adventurous, generous, and popular" (Coulson 1958) and spent his

leisure time in "hedonistic extravagance" (Jones 1994), even being crowned by his friends "king of the revelers" ("Francis" 1960). He later claimed he heard Christ's voice asking him to rebuild a church, whereupon he plunged into religious service, adopting the life of a hermit and later forming the order of friars named for him (the Franciscans; Coulson 1958).

Others who were transformed from worldly to austere included the Blessed Angela of Foligno (1250–1309) who had married and bore several children but lost them all after her husband's death. After selling all her possessions, she gave the proceeds to the poor and joined the Third Order of St. Francis (Wilson 1988, 132). Another example is St. Catherine of Genoa (1447–1510) who married at sixteen, spent "ten years of a pleasure-seeking existence," then, with her husband, devoted her life to tending to the sick in a local hospital (Wilson 1988, 133).

A more recent example is that of Father James Bruse (the Virginia priest with the wrist wounds mentioned earlier). Bruse's pre-ordination life included finding his way into the *Guinness Book of World Records* in 1978 for riding a roller coaster for five straight days. He became a Roman Catholic priest the following year but subsequently found he had lapsed into a routine. Then came the "dramatic" events of 1991–1992 in which he not only experienced the stigmata but discovered statues weeping in his presence (Harrison 1994, 80–87).

Also characteristic of many, if not most, stigmatics are a variety of symptoms "ranging from what have been described as the 'mystical' to the 'hysterical'" (Harrison 1994, 31). Taking the hysterical first, Marguerite of the Blessed Sacrament (Marguerite Parigot, 1619–1648) was prey to "devastating apparent diabolic attacks," while Anna Maria Castreca (1670–1736) "would hurl herself violently around the room" and revert "to the speech and manner of a child," and in his early life Padre Pio (1887–1968) was "emotionally disturbed." A few stigmatics were allegedly attended by "poltergeist phenomena" (disturbances attributed to "noisy spirits" but often found to be the pranks of adolescents); among them were Johann Jetzer (c. 1483–c. 1515) and Teresa Helena Higginson (1844–1905) (Wilson 1988, 131–148).

Figure 2. Post-stigmata marks on top of one of Rivas's feet, most or all of which are scars from previous "stigmata."

Illness is another frequent characteristic. René Biot, in his *The Enigma of the Stigmata* (1962, 57), exclaims with wonder at "how many stigmatics have been bedridden!" He notes that St. Lidwina (d. 1433) had so many alleged illnesses that she was "a sort of pathological museum," indeed a "museum of horrors." Similarly, Therese Neumann experienced alternate bouts of convulsions, blindness, deafness, mutism, paralysis, and so on—effects that appear to have been due to hysterical hypochondria or, more likely, outright fakery since the alleged conditions evaded diagnosis (Rogo 1982, 65–66; Nickell 1993, 227–228). Given such cases one researcher noted the parallels between stigmata and Münchausen's syndrome, an emotional disorder involving feigned or inflicted illness (Schnabel 1993).

Still other stigmatics—like St. Veronica Giuliani (c. 1640–1727), Victoire Claire (c. 1808–1883), along with numerous others—often lapsed into states of ecstasy (i.e., apparent trance arising out of religious fervor). Following St. Francis, who supposedly received his stigmata during a vision of Jesus's crucifixion, came several emulators, including Passitea Crogi who, on Palm Sunday 1589, fell into an ecstasy and later described a vision of Christ bruised and bleeding. Other vision-delivered stigmata were claimed by Johann Jetzer, Therese Neumann (1898–1962), and James Bruse.

A great number of stigmatics were blessed, allegedly, with other supernatural phenomena, including the powers of prophecy and healing, levitation, bilocation (supposedly being in two places simultaneously), and inedia (the alleged ability to forgo nourishment). As an example of the latter, Angela of Foligno (1250–1309) reportedly went without food for twelve years. After death, the bodies of a few stigmatics were discovered to be "incorruptible" (i.e., to withstand decay). Also vials of blood preserved from the stigmatic wounds of Passitea Crogi purportedly reliquefy on occasion (Wilson 1988, 131–148). Needless to say, perhaps, such claims are unproved, and may be attributed to folklore, misperceptions and misunderstandings born of superstition, and pious fraud (Nickell 1993).

## Proven Frauds

That many stigmatics were fakes is well established. For example, Magdalena de la Cruz, having become ill in 1543 and fearful of dying a sinner, confessed that her stigmata, inedia, and other phenomena were deliberate deceptions. Another, Maria de la Visitacion, known as the "holy nun of Lisbon," was accused by a sister nun who saw her painting a fake wound onto her hand. Although initially defended by doctors in 1587, she was brought before the Inquisition, whereupon her wounds were scrubbed and the coloration washed off, revealing "unblemished flesh" beneath (Wilson 1988, 26).

Another fake was Palma Maria Matarelli who not only exhibited the stigmata but also "miraculously" produced Communion wafers on her tongue. Pope Pius IX privately branded her a fraud, stating that he had the proof in his desk drawer and adding, "She has befooled a whole crowd of pious and

credulous souls" (quoted in Wilson 1988, 42). A more public condemnation awaited Gigliola Giorgini (b. 1933): Discredited by church authorities, in 1984 she was convicted of fraud by an Italian court (Wilson 1988, 42, 147).

The authenticity of some stigmata may be questioned in light of the mystic's character. For example, Teresa Helena Higginson (1844–1905), an English stigmatic, was dismissed as a teacher on accusations of theft, drunkenness, and unseemly conduct. And Berthe Mrazek, a Brussels-born circus performer turned stigmatic, was first regarded seriously but doubts came in 1924 when she was arrested for fraud and committed to an insane asylum (Nickell 1993, 223). Still other stigmatics must be viewed in light of their propensity for self-punishment and self-mutilation. These include the thirteenth-century masochist Lukardis of Oberweimar, who, before exhibiting the stigmata, "had the habit of driving her fingernails into her palms" (Wilson 1988, 132)!

Circumstances surrounding the twentieth century's two best-known stigmatics—Theresa Neumann and Padre Pio (both mentioned previously)—raise further doubts about the genuineness of the phenomenon. For example, a Professor Martini conducted a surveillance of Therese Neumann and observed that blood would flow from her wounds only on those occasions when he was persuaded to leave the room, as if something "needed to be hidden from observation." He added: "It was for the same reason that I disliked her frequent manipulations behind the raised [bed] coverings" (Similar suspicions also accompanied her professed demonstration of inedia; Wilson 1988, 53, 114–115).

As to Padre Pio, the local Roman Catholic clergy accused his friary of putting him on display in order to make money. Certainly a cult grew up around him, and village hucksters sold his credulous disciples alleged relics in the form of pieces of cloth daubed with chicken blood. Some physicians believed his wounds superficial but the determination was made difficult by their supposed painfulness and their being covered by "thick crusts" of what was thought to be blood. A distinguished pathologist sent by the Holy See noted that beyond the scabs was a lack of "any sign of edema, of penetration, or of redness, even when examined with a good magnifying glass." Indeed, he concluded that the side "wound" had not penetrated the skin at all. And while in life Pio perpetually kept his "wounds" concealed (wearing fingerless gloves on his hands), at death there was only unblemished skin (Ruffin 1982, 146–154, 305).

Many Catholic scholars have expressed skepticism about the genuineness of stigmata. One was a neuropsychiatrist who had personally observed thirty stigmatization cases and in none of them "was able to eliminate, absolutely and decisively, every kind of artificial action" (quoted in Biot 1962, 102–103). Although attributing most instances to suggestion rather than hoaxing, Herbert Thurston (1952, 100) found "no satisfactory case of stigmatization since St. Francis of Assisi."

Figure 3. Small cuts on author's hand produce sufficient blood to simulate a sizeable wound.

Thurston and others defend Francis on grounds of his piety and character; however, his single-minded desire to imitate Jesus, his "immense capacity for self-sacrifice," and the fact that "he was a son of the church to the marrow of his bones" (Coulson 1958, 188) may have led him to foster a pious deception—something that many others have clearly been unable to resist.

**Professor Martini conducted a surveillance of Therese Neumann and observed that blood would flow from her wounds only on those occasions when he was persuaded to leave the room, as if something "needed to be hidden from observation."**

### A Recent Case

The Fox network's "Signs from God" heralded the Bolivian miracle claimant Katya Rivas whose repertoire included not only stigmata but the production of an unusual "delta state" on an EEG, automatic writing in languages she allegedly did not know, and multicolored "glitter" on a print of the Image of Guadalupe in her home. (For a review see Nickell 1999.) The show was hosted by Australian journalist Michael Willesee who, during an airplane accident in 1998, had "re-embraced his Roman Catholic faith in an instant conversion" (Randi 1999).

Rivas claimed she received a message from Jesus telling her that while she would not produce stigmata as hoped on Good Friday (the day Christians commemorate Jesus' crucifixion), patience would be rewarded. A later message announced that full stigmata would take place on the day following Corpus Christi (a Catholic festival honoring the Eucharist or Lord's Supper). The night before the stigmata were to appear, Rivas gave a sample of her blood as a control, since there was speculation that the blood from her stigmatic wounds might not be hers exclusively.

Come the appointed time, unsuspecting viewers were treated to what had all the signs of a staged event. Rivas was abed, in a fashion reminiscent of Therese Neumann, and the covers provided ample concealment if trickery were involved. No doctor was in attendance. Michael Willesee made a cursory examination of Rivas's hands and feet, and referred to scars from previous stigmata. These were seen on her feet but it was unclear whether there were prior marks on her hands also. (This is significant in light of developments, as we shall see.)

Figure 4. Transfer of blood from wound shown in figure 3 produced fake wound on palm.

During real or pretended suffering, Rivas exhibited, first, pricklike marks and bleeding on the forehead (as from a crown of thorns)—though apparently not on the sides or back of the head, suggesting the marks were only for show. Then there was (possibly) a pink mark on the left palm, followed by a tiny cross on the back of the hand that was initially without blood. Later there were bloody "wounds" on both sides of the hands and feet. Willesee used swabs to obtain samples of the blood for analysis. No side wound or other crucifixion markings ever appeared. At the end of the experience—or demonstration—Rivas displayed paroxysms of a death-like agony imitative of Jesus's crucifixion.

Rivas's wounds were never seen in the act of spontaneously issuing but instead were shown in incremental shots *after* each appearance—just as they would if self-inflicted during periods of concealment. Among other suspicious elements were the mismatching of "entrance" and "exit" wounds, those on the left foot being far out of alignment. Also, those on the palms and soles of the feet were, as far as could be seen, only smears of blood.

Moreover, such wounds as could be distinguished were not puncturelike but rather consisted of multiple cuts, including the cross on the back of the left hand (figure 1) and an array of slashes atop each foot. The latter are curiously in pairs (see figure 2) as if produced by a two-pronged implement, like the sharp-cornered, calyx-like ring Katya Rivas wore during the event.

Supposedly only 24 hours later, the camera recorded Willesee inspecting Rivas's wounds. Apparently those on the palms and soles had vanished completely (but were not specifically shown) and the markings that remained were seemingly in an advanced state of healing. Willesee treated this as remarkable, although another interpretation is that the vanishing of some "wounds" indicated they were never there in the first place and that most or all of the markings were old cuts from previously faked stigmata.

A genuine element of the affair was the blood itself, which was shown by DNA analysis to be Katya Rivas's. Unfortunately for the miracle-mongering journalist Willesee—who made much of the possibility that it might be Christ's blood in whole or in part—it proved to be Rivas's alone.

When I was asked to appear on a television documentary on stigmata and to discuss the Katya Rivas case, I decided to experiment beforehand by inflicting wounds on myself. I used a sharp blade to cut a cross on the back of my left hand. This shallow, superficial wound yielded enough blood to produce the effect of a larger wound (figure 3) and even (by transfer) create a "wound" on the palm (figure 4). The next day the latter had of course vanished and the cross had begun to heal. There are certain medicinal preparations one can apply to promote healing and, as I found, cosmetic creams that through their hiding power can seemingly advance the healing or eliminate the wound entirely.[1]

My examination of the video showing Katya Rivas's alleged stigmatization and the simple experiments I performed persuaded me that not only could her stigmata not be authenticated, but, indeed—like other instances of the alleged phenomenon throughout history—they cannot be distinguished from a pious hoax.

## Note

1. I also discovered that one could produce the opposite effect, renewing the bleeding of a cut that was many hours old, by applying hydrogen peroxide. This has implications to cases of stigmata in which bleeding was reported over an extended time, although there are many ways of accomplishing such an effect.

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# Can We Really Tap Our Problems Away?

## *A Critical Analysis of Thought Field Therapy*

*Thought Field Therapy is marketed as an extraordinarily fast and effective body-tapping treatment for a number of psychological problems. However, it lacks even basic empirical support and exhibits many of the trappings of a pseudoscience.*

BRANDON A. GAUDIANO and JAMES D. HERBERT

It is nothing new to find enterprising entrepreneurs seeking to profit from their novel inventions, which are often claimed to produce miraculous results for their users. The field of mental health is no exception. In fact, there has recently been a surge of putatively revolutionary treatments for various psychological problems that claim to be far superior to standard treatments in both effectiveness and efficiency. Known as "power" or "energy" therapies (Gist, Woodall, and Magenheimer 1999; Herbert et al. in press; Swenson 1999), these treatments are gaining widespread acceptance among mental health practitioners, despite their frankly bizarre theories and techniques, extraordinary claims, and absence of scientific support. One of the most

popular of these power therapies, known as Eye Movement Desensitization and Reprocessing (EMDR), involves a therapist waving his or her fingers in front of the patient's eyes while the client imagines various disturbing scenes that are thought to be related to the patient's problems. In fact, EMDR, a "power therapy" that alludes to neural networks instead of energy fields for its theoretical basis, has been described as a prototypical case of pseudoscience within mental health (Herbert et al. in press; Lohr, Montgomery, Lilienfeld, and Tolin 1999; Lilienfeld 1996).

There is another treatment approach on the rise that threatens to overtake EMDR as the premiere power therapy for the twenty-first century: Thought Field Therapy (TFT; Callahan 1985). Roger Callahan, TFT's inventor, claims that he can train therapists to be over 97% effective using his "revolutionary" procedures in treating a variety of common psychological problems including anxiety and depression. Since the history of psychotherapy is replete with treatments that failed to live up to their initial hype, it seems prudent to take a closer look at TFT.

## Origins and Methods

Callahan (1997) states that he accidentally discovered TFT while treating a client named Mary, who had a severe fear of water. Inspired by an acupuncture class he was taking at the time, Callahan instructed Mary to firmly tap the area under her eye with her fingers, leading to a miraculous and immediate resolution of Mary's phobia. Callahan subsequently developed the comprehensive set of techniques and theory that is now known as TFT. The therapy is based on the idea that invisible energy fields called "thought fields" exist within the body (Callahan and Callahan 1997). Environmental traumas and inherited predispositions are theorized to cause blockages, or what Callahan terms "perturbations," in the flow of energy in these thought fields. Callahan theorizes that the commonly observed neurochemical, behavioral, and cognitive indicators of disorders such as depression are the result of these perturbations. In other words, the root cause of all psychological problems are blockages in energy fields.

In order to correct these perturbations, clients are directed by the TFT therapist to tap on the body's "energy meridians" in specific sequences, called "algorithms," which vary based on the particular problem being treated (Callahan and Callahan 1997). For example, the client may be instructed to tap at the corner of the eyebrow five times and then continue tapping on other parts of the body in a specific sequence as instructed by the therapist. In addition, the clients are told to roll their eyes, count, and hum a few bars of a song at various points during the treatment. Callahan states that when the thought field is "attuned," that is, when the person is thinking about the distressing event or image, perturbations are able to be located and corrected. The tapping is theorized to add energy to the system, which then re-balances the overall energy flow, thereby eliminating the distress at the source.

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## Theoretical Underpinnings

The theory behind TFT is a hodgepodge of concepts derived from a variety of sources. Foremost among these is the ancient Chinese philosophy of *chi*, which is thought to be the "life force" that flows throughout the body. Beyerstein and Sampson (1996) argue that *chi* is more accurately conceptualized as a philosophy, not a science, and its existence is not empirically supported. In addition, they note that while acupuncture, a procedure used to correct the flow of *chi*, has been shown to provide some minor analgesic effects, its utility has not been demonstrated for treating illnesses or diseases. TFT also borrows techniques from a procedure known as Applied Kinesiology that is used to test muscles for "weaknesses" caused by certain food or chemical pathogens (Sampson and Beyerstein 1996). Applied Kinesiology is a scientifically discredited procedure. For example, Kenny, Clemens, and Forsythe (1988) found that those using the techniques did no better than chance in determining nutritional status using muscle testing. Finally, TFT even borrows some of its concepts from quantum physics. For instance, the idea of active information, in which small amounts of energy can affect large systems, is used to support the existence of perturbations (Bohm and Hiley 1993). There are obvious problems with the theoretical basis for TFT, not the least of which is the complete lack of scientific evidence for the existence of "thought fields."

TFT, as with other new "energy" therapies, is based on misconceptions or outright distortions of the concept of energy as it is used by scientists (Saravi 1999). In physics, energy is defined simply as the capacity to do work, and energy exchanges are observable and measurable. Energy therapists, in contrast, use the term to describe a kind of universal life force that influences health, but they provide no direct data to document the presence of such a force. Saravi concludes that "New Agers' and psychobabblers' 'energy' has only a remote relationship with its physical, scientific counterpart. For them, it is just a word conveniently invoked to explain phenomena whose very existence is far from certain" (47).

## Extraordinary Claims of Success

TFT is marketed primarily through the Internet. To attract potential therapists to take TFT courses and to persuade prospective clients to pay for this therapeutic approach, amazing claims are presented on several TFT-related Web sites. For example, Callahan's primary Web site[1] claims that TFT allows individuals "to eliminate most negative emotions within minutes." In addition, Callahan asserts that TFT's effectiveness increases with higher levels of training. For example, another Web site[2] publicizes that therapists can achieve an 80 percent effectiveness rate from learning to use specific algorithms, a

90–95 percent effectiveness rate from using "Causal Diagnostic" techniques, and an over 97 percent effectiveness rate using a technique mysteriously termed "Voice Technology." Yet another Web site,[3] this one based in the United Kingdom, states that TFT is the only psychotherapy that can "genuinely claim to offer a cure." TFT claims to be able to "cure" people of a variety of psychological problems, including phobias, panic, post-traumatic stress disorder, addictions, sexual problems, pain, depression, anger, general distress, and even other less serious problems such as fingernail biting (Hooke 1998a). One noted TFT therapist even claims to have cured her dog of a fear of heights using the trauma algorithm (Danzig 1998).

Despite these miraculous assertions, no controlled studies have been published in peer-reviewed scientific journals to provide evidence for TFT's claims. Instead, testimonials and uncontrolled case studies are offered to support these astonishing declarations of success (Callahan 1995). The vast majority of these claims are made via Internet postings (Lohr, Montgomery, et al. 1999). Such anecdotes, however, do not constitute probative data on the question of TFT's efficacy. Callahan often claims that his public demonstrations of TFT on television shows such as *The Leeza Gibbons Show* (aired October 12, 1996) provide dramatic proof of success, thereby circumventing the need for empirical research. However, such vivid but uncontrolled presentations are not evidential, given the extraordinary demand characteristics (i.e., the implicit pressures engendered by the situation for clients to behave in accordance with their beliefs about what is expected of them) inherent in such settings, not to mention the lack of objective, standardized assessments of improvement in symptoms (Hooke 1998b). Given that Callahan claims to have been using his techniques for over twenty years, it is curious why no controlled studies have been conducted. It should be quite easy to demonstrate the effects of a treatment with a 97 percent effectiveness rate using accepted methods of clinical science.

## The Limited Research Findings

TFT has recently attracted the attention of two Florida State University researchers. In considering their work, it is important to note that none of their findings have been published in peer-reviewed journals; instead they report their results in one of the researcher's self-published Internet "journal." Carbonell and Figley (1999) tested four controversial treatments for trauma, including TFT. Thirty-nine individuals who reported distress from having experienced a traumatic event were given one of the four treatments for up to one week. Overall, Carbonell and Figley reported that participants demonstrated some improvement in self-rated distress and on questionnaire measures from pre-treatment to six-month follow-up. This study is so seriously flawed, however, that the results are completely uninterpretable. The most critical flaw is the absence of any control for the passage of time. In the absence of a no-treatment or a placebo control group, there is no way to know if any observed improvement was a function of factors such as the natural remission of symptoms over time, statistical regression to the mean (i.e., the tendency for extreme scores on a measure to be less extreme upon retest), or placebo effects. This concern is heightened by the absence of measures taken immediately following treatment, as the only outcome measures were reported six months following treatment. Also, subjects were not diagnosed with post-traumatic stress disorder using standard diagnostic criteria, and it is not clear how much subjects were impaired by their traumatic experiences. Moreover, daily diaries and recordings of distress revealed that subjects appeared to have difficulty distinguishing distress associated with the normal ups and downs of life from distress associated with their trauma. For example, a participant who had suffered childhood abuse reported high distress, but upon query disclosed that this distress was due to her car getting a flat tire rather than her trauma, raising questions about the reliability of these subjective distress ratings (Huber 1997).

Furthermore, the authors did not report subjecting their data to statistical analysis, instead relying on their visual inspection of the data for interpretation. Interestingly, even these data do not support the large effect sizes claimed by TFT supporters. On the contrary, mean scores on the self-report questionnaires showed only relatively paltry changes in symptoms, far below the claims of miraculous improvement that Callahan and others have consistently claimed. Thus, Carbonell and Figley's (1999) study, which is the most serious research attempt to date, does not support the effectiveness of TFT. Nevertheless, the results of this study, originally presented at a 1995 symposium, are frequently cited by Callahan and others as providing evidence of TFT's efficacy (Callahan and Callahan 1997). The only other "research" on TFT is either presented in internally circulated publications such as Callahan's newsletter *The Thought Field*, nonscientific magazine reports (e.g., Shamis 1996), or on Web sites (e.g., Carbonell 1996; see Swenson 1999 for a review).

## Alternate Explanations

Occam's Razor is a principle often applied in science indicating that, all things being equal, the most parsimonious explanation for a phenomenon is the preferred one. Applying this principle to TFT, there is little need for concepts such as energy fields and perturbations to explain any effects that TFT might show. TFT highlights specific tapping sequences as its proposed mechanism of action; however, other components of the treatment protocol may be responsible for any observed benefits. In addition to the absence of controls for spontaneous remission, no research has ruled out factors that are common—to greater or lesser degrees—in all psychotherapies. These include placebo effects resulting from the mere expectation for improvement, demand characteristics, therapist enthusiasm and support, therapist-client alliance, and effort justification (i.e., the tendency to report positive changes in order to justify the effort exerted; Lohr, Lilienfeld, Tolin, and Herbert 1999). Thus, despite the absence of empirical evidence to support TFT's claims of tremendous effectiveness, it would not be surprising to find that the pro-

cedure sometimes produces benefits for some individuals owing to these common mechanisms shared by all forms of psychotherapy. Serious psychotherapy innovators go to great lengths to conduct studies to demonstrate that the hypothesized active ingredients of their procedures outperform these so-called "nonspecific" effects. No such effort has been made by the promoters of TFT.

Callahan, however, dismisses the possibility that TFT could be explained by such mechanisms. He asserts that "clinical evidence" has ruled out the possibility of nonspecific or placebo effects accounting for TFT's results, but fails to support this claim (Callahan and Callahan 1997). He frequently states that placebo effects cannot be operative in TFT because some clients express skepticism that the tapping will work (Hooke 1998a). This argument demonstrates a misunderstanding of the placebo concept, which does not necessarily require the individual to fully believe in the practitioner's explanation for why a procedure works (Bootzin 1985; Dodes 1997). Callahan (1999) also reports case studies in which he claims to have observed a "re-balancing" of the autonomic nervous system after treatment with TFT, and that this somehow refutes the placebo explanation. In fact, it is well accepted that the autonomic nervous system, including phenomena such as pulse, blood pressure, and electrocardiogram changes, can be influenced by various psychological events, including placebos (Ross and Buckalew 1985).

In addition to nonspecific and placebo effects, TFT appears to incorporate procedures from existing, well-established therapies. TFT therapists instruct clients to focus repeatedly on distressing thoughts and images during the tapping sequences. Such repeated exposure to distressing cognitions is a well-known behavior therapy technique called imagery exposure (Foa and Meadows 1997). Furthermore, TFT therapists utilize cognitive coping statements throughout treatment (e.g., "I accept and forgive them for what they did"), which represent another established cognitive therapy technique. In short, any effects that TFT might show can be readily explained by known mechanisms, without invoking unfounded concepts such as "perturbations" and "thought fields" (Hooke 1998a).

## TFT and EFT

Since the emergence of TFT, several therapists have recently developed offshoot therapies based on treating the body's energy fields. The most successful of these TFT derivatives was developed by Gary Craig. Craig (1997), who has a degree in engineering and formerly studied under Callahan, created what he calls Emotional Freedom Techniques (EFT). EFT is very similar to TFT, except that it employs one simplified and ubiquitous tapping procedure instead of applying different algorithms to treat different problems. On his Web site[4], Craig asserts that Callahan's reliance on differing algorithms is unnecessary because he has witnessed TFT therapists tap in the wrong order or apply the wrong algorithm to the particular problem and still obtain improvements. Craig's anecdotal evidence appears to contradict Callahan's anecdotal evidence. Furthermore, Craig extends his tapping therapy far beyond the realm of mental health, reporting testimonials from individuals who claim to have successfully used EFT to treat everything from autism to warts and various other medical problems with positive results. In the latest developments, Craig has reported on the positive effects of "surrogate tapping," in which therapists tap on themselves to treat the problems of others.

A scientifically minded investigator would have then taken Craig's observations a step further and tested a completely "placebo" algorithm which did not tap on any supposed energy meridians to see if it produced similar results. However, Craig reports that he has never carried out this simple experiment nor does he know of anyone who has (Craig, personal communication, January 14, 2000). Furthermore, Craig speculates that a placebo algorithm may be impossible because tapping anywhere on the body will affect the body's energy meridians. This position conveniently renders Craig's theory unfalsifiable and therefore outside the realm of science.

## Pseudoscience in Psychotherapy

Lilienfeld (1998) argues that the proliferation of pseudoscience in psychotherapy is threatening the public welfare and damaging the reputation of psychology. Lohr, Montgomery et al. (1999) assert that the contemporary commercial promotion of treatments for the sequelae of trauma, such as EMDR and TFT, are commonly characterized by a host of pseudoscientific practices. In general, pseudoscience can be identified as consisting of "claims presented so that they appear scientific even though they lack supporting evidence and plausibility" (Shermer 1997, 33). For example, TFT incorporates scientific-sounding terminology by speaking of "bioenergies" and taking concepts from quantum physics out of context in an attempt to gain credibility. No empirical evidence is provided for the existence of central concepts such thought fields or perturbations, which are instead inferred through ad hoc, circular reasoning. For example, Callahan and Callahan (1997) state that perturbations are ultimately demonstrated through their effects, meaning that a perturbation in the thought field must have existed because after treatment the person no longer experiences distress.

The hallmark of a science is falsifiability (Popper 1965). A scientific proposition must specify, a priori, predictions that can be refuted, at least in principle. Callahan has not provided a framework by which his theory could be brought under scientific investigation. As is characteristic of pseudoscience, only confirming evidence of TFT is sought out and presented by advocates (Lohr, Montgomery, et al. 1999). Neither Callahan nor other proponents, including Carbonell and Figley (1999), have subjected TFT to controlled evaluation using accepted scientific methods and published results in peer-reviewed journals.

The objective of a pseudoscience is often persuasion and promotion, in lieu of responsible investigation of claims (Bunge 1967). Web sites advertise courses and multilevel training in TFT techniques for thousands of dollars. The highest level of training in TFT is called Voice Technology (VT), which supposedly allows the therapist to diagnosis perturba-

tions and treat clients entirely over the telephone by analyzing their voices. The effectiveness of VT is said to approach 100 percent (Callahan 1998). Callahan sells this technique for $100,000, and trainees must sign nondisclosure contracts that forbid them from discussing or revealing any aspects of the technique. Recently, the Arizona Board of Psychologist Examiners put a psychologist on probation for refusing to provide specific information about VT to back up his assertion of its high degree of effectiveness (Foxhall 1999; Lilienfeld and Lohr 2000). Interestingly, on his Web site[5] Gary Craig, who was trained in the method, stresses that the putative "secret" behind VT is readily available "in the public domain and can be learned at a weekend workshop for a few hundred dollars." The mystery surrounding VT only has the effect of obfuscating independent examination and investigation.

Finally, pseudosciences explain away or reinterpret failures as actually providing confirmatory evidence (Lakatos 1978). Callahan proposes the existence of a phenomenon termed "psychological reversal" to explain instances in which TFT fails to work. Psychological reversal is claimed to result in self-sabotaging attitudes and behaviors and is manifested in the reversed flow of energy that blocks the effects of the treatment (Callahan 1998). The prescribed treatment for such a condition involves reciting more cognitive coping statements (e.g., "I accept myself, even though I have this problem") that may alleviate distress independent of tapping. In addition, "energy toxins" are claimed to be substances that negatively affect the thought field, even if the person is not physically allergic to these supposed pathogens. These substances are proposed to cause a previously eliminated symptom to return (Joslin 1999). Using "muscle testing" procedures and VT, the offending pathogen can allegedly be identified, then removed until the treatment works again. Both psychological reversal and energy toxins are prime examples of post hoc reasoning and attempts to ignore disconfirming evidence by creating uncorroborated explanations of TFT failures.

## Conclusion and Implications

Despite extraordinary claims to the contrary, TFT is not supported by scientific evidence. The theoretical basis of TFT is grounded in unsupported and discredited concepts including the Chinese philosophy of *chi* and Applied Kinesiology. Many of the practices of TFT proponents are much more consistent with pseudoscience than science. Controlled studies evaluating the efficacy of TFT will be required for the treatment to be taken seriously by the scientific community.

TFT is only now beginning to garner negative press, and critiques are starting to appear in the popular literature. For example, Swenson (1999) recently reviewed the extraordinary claims for TFT made by Callahan and others, and noted the absence of controlled research to support these claims. Recently in the SKEPTICAL INQUIRER, Lilienfeld and Lohr (2000) reported on the American Psychological Association's decision in late 1999 to prohibit its sponsors of continuing education programs for psychologists from offering credits for training in TFT, as well as the sanctioning of an Arizona psychologist for using TFT and Voice Technology within the practice of psychology.

Nevertheless, thousands of therapists from various professional disciplines continue to pay for TFT training courses. Much of TFT's marketing success can be attributed to the prevalence of pro-TFT Web sites that promote strong claims of its effectiveness. TFT therapists, some of whom have no traditional training in psychology or psychotherapy, appear to be satisfied with TFT's vivid anecdotal stories of success, and are not aware of or not bothered by the overwhelming lack of empirical support for the procedure. Englebretsen (1995), among others, points to the alarming rise of postmodernist attitudes currently permeating the mental health field, exemplified by the willingness of some clinicians to value compelling anecdotal stories over controlled empirical data. This postmodernist mindset promotes the notion that all truth is relative and contextual; science is only one of many modes of thinking, each of which is equally valid. Such attitudes render the mental health field fertile breeding ground for pseudoscientific therapies such as TFT and its derivatives. Healthy skepticism competes head-to-head with extraordinary claims and, as is often the case, many mental health clinicians choose to ignore the facts in favor of miraculous possibilities.

## Notes

1. http://www.tftrx.com
2. http://www.thoughtfield.com
3. http://homepages.enterprise.net/ig/
4. http://www.emofree.com/scien-i.htm
5. http://www.emofree.com/about.htm

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*THOUGHT FIELD THERAPY*

*Continued on page 36*

# Absolute Skepticism Equals Dogmatism

*There are two main kinds of skeptics: moderate and radical. The moderate skeptics do not question the totality of knowledge. Instead, they proceed gradually, because questioning any bit of knowledge involves comparing it with another piece that is assumed, if only for the sake of the argument. By contrast, wholesale skepticism admits no benchmark and is thus an obstacle to inquiry, just like dogmatism. Scientists, technologists, and humanistic researchers practice piecemeal skepticism, which, unlike absolute skepticism, is constructive.*

MARIO BUNGE

There are skeptics and skeptics: some of them are radical, and others moderate. Whereas the most radical among them doubt everything, the moderates doubt only what looks implausible in the light of some body of reasonably well-established knowledge. The former are intent on destruction, whereas the latter engage in constructive criticism and creative inquiry.

How, if not against some benchmark, can one assess the truth of a statement or the efficiency of a method or rule? Embryologists deny virgin birth among humans because they know that the human egg does not start dividing unless it has captured a spermatozoon. Cognitive neuroscientists deny telepathy because they know that thought, being a

brain process, cannot get detached from the brain and travel on its own. Engineers deny the possibility of a machine that produces energy without consuming any, because they know the principle of conservation of energy. And so on and so forth.

In all these cases, the argument schema is this: A and B are mutually incompatible. Now, so far A has been validated, or has proved to be far more plausible than B. Hence, reject B, at least for the time being. Shorter: We judge the newcomer B on the basis of its well-established rival A. Such piecemeal evaluation works where wholesale evaluation does not.

There are then two ways one can deny a statement or a rule: with or without some reason or premise taken to be true if only for the sake of argument. But to deny anything without offering any reasons is just as dogmatic as to affirm anything without any grounds. In other words, absolute skepticism is just a form of dogmatism.

Now, there can be two grounds for casting doubt on a proposition or a rule: empirical or theoretical. In the first case, the idea is rejected for failing to match the available empirical evidence. In the second, it is rejected for being incompatible with a well-tried theory. In both cases, the adverse verdict is pronounced on the strength of a piece of knowledge that is not being doubted for the time being. If nothing were assumed, nothing could be proved or disproved. In other words, there is no rational doubting in a conceptual vacuum. If preferred, we can be spared error or waste only at the price of buying (or at least borrowing) truth or efficiency, as the case may be.

Moreover, in both of the above cases logic, the canon of formal validity, is taken for granted. The skeptics who refuse allegiance to logic are irrationalists, for they refuse the basic rules of rational debate. This is the case with the postmoderns, who also reject science. They are absolute skeptics—except with regard to their own pronouncements.

The moderate skeptic regards doubt as a means to attain the truth, if not total and definitive at least approximate and until further notice. Moderate skepticism is thus methodological, whereas radical skepticism is systematic. The former proceeds in a partial and gradual fashion, the latter in a total and sudden manner. Moderate skepticism offers the prospects of gradual advancement of knowledge, whereas radical skepticism delivers instant ignorance.

How do mathematicians, scientists, technologists, and science-oriented humanists proceed: in a global or in a piecemeal fashion? In other words, do they doubt everything at once, and start every research project from scratch, or do they build on antecedent knowledge, and doubt only one item at a time? That is, how does the advancement of knowledge proceed: by revolution or by evolution?

From our previous discussion, it should be clear that the total revolutions imagined by Thomas S. Kuhn, Paul K. Feyerabend, and their followers are only figments of their imagination. The ideas of "incommensurable" (incomparable) "paradigms," and of irrational "paradigm shifts" similar to religious conversions, are logically invalid and historically false. Every breakthrough in one field of knowledge has used findings in other fields. And every theory or method has displaced its rivals only if shown to be objectively superior to them.

For example, the ancient Greeks used the scattered mathematical results of the Egyptian and Sumerian accountants and land surveyors, which they transformed qualitatively by adding generality, proof, systematization—and excitement. The seventeenth-century scientific revolution would have been impossible without the previous revival of Greek mathematics. Faraday and Maxwell created field physics by enriching the legacy of Volta, Galvani, and Ampère. Einstein's special relativity was, by his own admission, but the culmination of Maxwell's theory. Darwin based his work on that of Lyell and uncounted naturalists and breeders. Neodarwinian evolutionary biology was the merger of Darwin's work with genetics. Molecular biology resulted from the fusion of genetics and biochemistry. And so on and so forth. In every knowledge breakthrough there has been continuity in some respects along with discontinuity in others—just as in biological and social evolution.

**Doubtless, there is no inquiry without some doubting. But doubt and criticism are filters or breaks rather than engines. The engines of inquiry are curiosity, discovery, and invention.**

Doubtless, there is no inquiry without some doubting. But doubt and criticism are filters or breaks rather than engines. The engines of inquiry are curiosity, discovery, and invention—discovery of previously unknown facts, and invention of new hypotheses, methods, and artifacts.

Once a fact has been reported, someone must examine it critically and attempt to replicate it independently. Once a hypothesis, method, or artifact has been devised, one must put it to the test. First discover or invent, then check. And checking whether something is true or efficient involves assuming that something else holds. In particular, error estimation presupposes knowledge (or at least assumption) of truth.

There are no tests in a vacuum, because every test has got to be designed and performed, and both operations involve some knowledge that is not being questioned in the process.

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Virologists do not question the physics involved in designing or operating their microscopes. Likewise, computer programmers question neither the mathematics they use nor the solid state physics that went into the design of computers. In sum, because all doubt is relative to some body of knowledge that is not being questioned at the moment, the discovery of every error reinforces a bunch of truths—those that function as benchmarks.

To be sure, it sometimes happens that researchers or practitioners in one field make use of findings in another that are eventually shown to be wrong. But such accidents are unavoidable, and, except when lives are involved, they can be corrected. And they do not prove that all knowledge is fallible, but only that some of it is—though the culprit cannot always be identified in advance.

Radical (or absolute) skeptics claim to believe that we should hold no beliefs—which is of course a self-destructive belief. By contrast, moderate skeptics hold that we should only propose plausible hypotheses, however counterintuitive, and be prepared to jettison the ones found to be false. Nobody can think, inquire, or act without holding some beliefs. What is wrong is not to hold beliefs but to cling to beliefs that have been amply refuted or that are incapable of being put to the test.

In conclusion, absolute skepticism is logically untenable and practically barren. The explorers in all walks of life need reasonable skepticism and constructive criticism, not nihilism, which is destructive by definition. Only the onlookers, who stay at home while the explorers face the risks of navigating uncharted seas, can afford to be absolute skeptics.

Radical or absolute skepticism does not help advance knowledge but, on the contrary, is an obstacle to inquiry. It is no coincidence that it thrives only in the faculties of arts and their vicinity. Mathematicians, factual scientists, engineers, medical researchers, jurists, management scientists, policy makers, and other knowledge workers are too busy searching for truth or efficiency to be able to indulge in wholesale skepticism. They know that, far from making every morning a fresh start, they build on past knowledge. They also know that, if they see farther away, it is because, as Bernard de Chartres said, and Newton repeated, they stand on the shoulders of giants.

In sum, in moderate doses, skepticism stimulates the search for truth; in immoderate doses, it inhibits such search. Should one therefore propose changing the title of this magazine into *MODERATE SKEPTICAL INQUIRER*? No, because the word *INQUIRER* makes it clear that, because all inquiry is based on some antecedent knowledge—if only to be able to state new problems or design new techniques—the skepticism in question is of the moderate and therefore constructive kind. □

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## *THOUGHT FIELD THERAPY*
*from page 33*


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# Did a Close Encounter of the Third Kind Occur on a Japanese Beach in 1803?

*Intriguing UFO-like stories written in the Japanese books* Toen Shousetsu *and* Ume no Chiri, *which were published in 1825 and 1844 respectively, are apparently fictions based on Japanese folklore. Illustrations of the UFO-like boats in these books are results of a combination of folklore and imagination.*

KAZUO TANAKA

Two Japanese books allegedly describe occurrences of an interesting incident in 1803, similar to a "close encounter of the third kind" (as designated by UFO researcher J. Allen Hynek and popularized by the 1977 film of the same name) of the modern UFO era (Mori 1987; Natsis and Potter 1995). In fact, illustrations in these texts (see figures 2 and 3) are very similar to depictions of modern UFOs (Shibusawa 1991; Mitsuse 1976; Takahashi 1996; Furukawa 1996; Matsuura 1998).

One book is *Toen Shousetsu*, published in 1825 (Nihon Zuihitsu Taisei Henshu-bu 1994). This book was written by many authors including Bakin Takizawa, who was a very famous novelist during the Tokugawa period in Japan. One

original copy of this book exists in Tenri University Library, Tenri City of Nara Prefecture. The other book is *Ume no Chiri*, published in 1844 (Nihon Zuihitsu Taisei Henshu-bu 1994) and written by Nagahashi Matajirou, about whom little is known in detail. One original copy of this book exists in Mukyuu-Kai Library, Machida City of Tokyo Prefecture.

These books collected documents of intriguing events that supposedly occurred during the Tokugawa period. Stories in the books are considered to be based on old tabloid-like newspapers called *kawara-ban*. Their credibility is not high. Since it is possible to confirm that these books are very old and really exist in the above libraries, there is no doubt that the stories in the books were written before 1844, long before the modern UFO era.

### *Toen Shousetsu* and *Ume no Chiri*

It is apparent that stories in the two different books describe the same incident, because the dates are similar and the incident occurred in the same year and in the same state in Japan. I have translated the stories into English as accurately as possible within my ability. Dates are lunar calendar.

### *Toen Shousetsu*

**Book title: *Utsuro-fune no Banjyo***
**(A Foreign Woman in the Hollow Boat)**

The story takes place on February 22 in the spring of 1803. Offshore from a beach called Hara-yadori in the territory of Ogasawara Etchuu-no-kami (4000 *koku*), who occupied a position named "Yoriai-seki" of Tokagawa shogunate at that time, a kind of boat was observed from the beach. People approached this boat using their small boats and eventually caught it. They towed it to the beach.

The boat was round and resembled a kind of *kou-hako* (a box used to burn incense). Its diameter was more than 3 *ken* (5.45m). On the upper part of the boat, there were glass-fitted *shoji* (windows with lattice) and they were shielded by *chan* (a kind of waterproofed putty made from pine-tree gum). The bottom of this ship was reinforced by separated iron plates. This structure may protect the boat from destruction by sunken rocks. Since the glass-fitted *shoji* was transparent, the people could see the inside the boat, where they found a woman with strange features. Her appearance is shown in figure 2. Her hair and eyebrows were red, and her face was pink. It seemed that long white hair was added to her original hair.

The following head note was included by the author of *Toen Shousetsu:*

> In a book named *Rosia Bunken Roku* (a book of travelers in Russia), we find the following sentence: "The slaves of the female dress is cylindrical and dress-radius becomes gradually smaller above the waist. The color of her dressed-up hair is changed to white using white powder." Judging from this sentence, this white hair of the foreign woman may be colored by the powder and she may be a woman who lives in a Russian dependency. More study in detail is required.

Her long hair may be made from fur or twisted strain. This kind of hairstyle could not be found in any literature. Furthermore, since her language could not be understood by anyone, none could ask her where she came from. This foreign woman held one square box whose size was about two *shaku* (60 cm) in her hands. It seemed that this box was very important to her because she held this box constantly, and she prohibited anyone from approaching it.

The objects found in this boat were investigated by the people. There was about two *shou* (3.6 liters) of water in the small bottle. (In a different book, the word "two *tou* [36 liters]" was used instead of "two *shou*" and that of "small boat" was used instead of "small bottle.") There were two pieces of carpet, cake-like food, and kneaded meat. While people discussed what to do about this boat, the woman observed them peacefully.

An old villager said, "This woman may be a daughter of a king in a foreign country and might have been married in her home country. However, she loved another man after marriage and her lover was put to death. Since she was a princess previously, she could get sympathy and avoid the death penalty. She had been forced to be put in this boat and was left to the sea to be trusted to fate. If this conjecture is correct, her lover's severed head is inside the square box. In the past, a similar boat with a woman inside drifted ashore in a beach not far from here. In that incident, a severed head placed on a kind of chopping board was found inside the boat. Judging from this kind of secondhand information, the contents of the box may be similar. This may explain why the box is so important to her and she is always holding it in her hands. We may be ordered to use much money to investigate this woman and boat. Since there is a precedent for casting this kind of boat back out to sea, we had better put her inside the boat and send it away. From a humanitarian viewpoint, this treatment is too cruel for her. However, this treatment would be her destiny."

Many foreign characters (see figure 1) were found inside this boat. I found similar characters on a British ship that recently arrived offshore from Uraga in Japan. From this observation, that woman may be a British, Bengali, or American princess. No one knows exactly. The woman and boat were illustrated by persons who were interested in this incident at that time and are shown in figure 2. I am somewhat disappointed because the illustrations and sentences are not consistent. If anyone knows anything concerning this incident, please let me know.

### *Ume no Chiri*

**Book title: *Utsuro-fune no Koto***
**(Concerning An Incident of The Hollow Boat)**

On March 24, 1803, a strange boat drifted ashore on a beach named Haratono-hama in Hitachi state in Japan. The boat was hollow and its shape was similar to a rice-cooking pot. It

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had a kind of rimmed-edge at the center-level part of the boat. In the part above this edge, the boat was painted in black and had four small windows on four sides. All *shoji* (windows with lattice) were shielded by *chan* (a kind of waterproof putty made from pine-tree gum). The lower part of the boat was reinforced by steel bars. These bars looked to be made of Western-made iron of the highest quality. The height of the boat was one *jyou,* two *shaku* (3.64m) and its diameter was one *jyou,* eight *shaku* (5.45m).

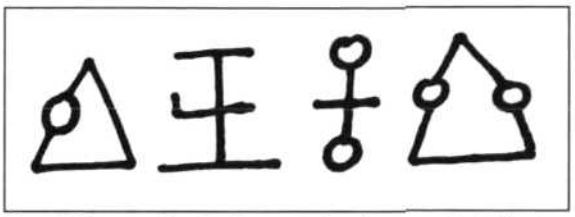

Figure 1. Characters found inside a mysterious boat according to the story *Toen Shousetsu.*

A woman (or girl) was found inside this boat and her age appeared around twenty. She was about five *shaku* (1.5m) tall and her skin was white as snow. Her long hair vividly hung on her back. Her facial features were incomparably beautiful. Her clothes were strange and unrecognizable and her language was not understood by anyone. She held a small box in her hands and prohibited anyone from approaching this box.

In this boat, there were two pieces of a kind of carpet. They were very soft and of an unknown type. There was a kind of cake and a kneaded food. There was also some sort of meat. There was a cup, and its design was very beautiful, though no one recognized the design.

"Haratono-hama" is a territory of Lord Ogasawara-Izumi.

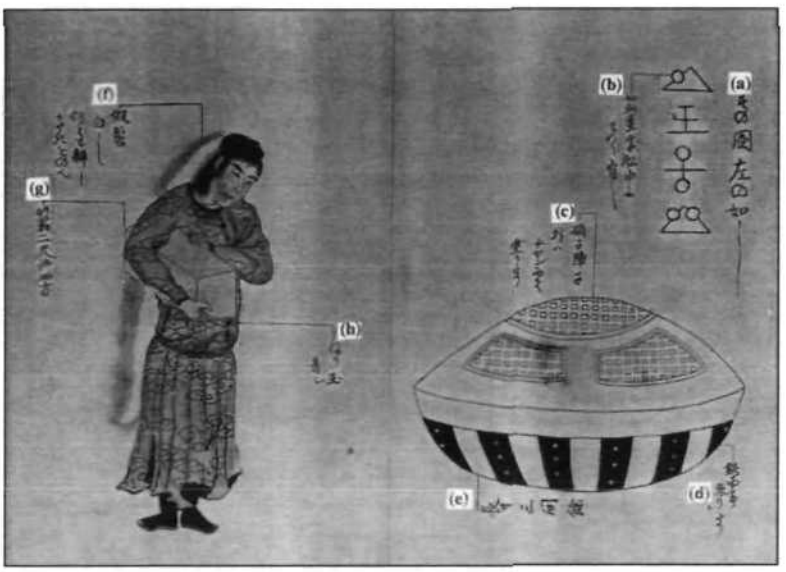


Figure 2. Illustration in *Toen Shousetsu.* (a) The illustrations are shown on the left. (b) A number of these kinds of characters were found. (c) Glass-fitted shoji. It was shielded by putty from the outside. (d) Iron bottom. (e) The length was about 3 *ken* (5.45m). (f) The added hair was white. (g) The size of this box was 2 *shaku* (60 cm) length. (h) The tempered ball was blue.

## Folklore of *Utsuro-fune* or *Utsubo-fune*

When we read the above stories and see illustrations as shown in figures 2 and 3, we may wonder whether these stories are based on a true incident. In fact, people who are interested in UFOs all over the world as well as in Japan have regarded the stories and illustrations as records of a close encounter of the third kind that really occurred in 1803 in Japan (Mori 1987; Natsis and Potter 1985; Takahashi 1996; Furukawa 1996).

However, people who have some knowledge of Japanese folklore have noticed that both stories are similar to the Japanese folklore of *Utsuro-fune* or *Utsubo-fune* (Ishigami 1992). This folklore has been handed down in many areas of the country, especially the western parts of Japan. Similar folklore and myths can be found throughout the world, such as in the account of Noah's ark (Nagadome 1997). It is possible that the origin of this folklore can be traced to the ancient national memory of Japanese immigration. In ancient times, people immigrated to the Japanese islands from many parts of Asia by using simple dugouts. After arriving at a Japanese island, some dominant families in Japan created the folklore based on the national memory and myth, in order to bolster the political legitimacy of their rule. The typical story of the folklore is that an ancestor of a family was a foreign noblewoman who crossed the sea by boat (Yanagida 1962). In the folklore, a dugout or a small boat has been called *Utsuro-fune* or *Utsubo-fune. Utsuro* in Japanese means "vacant" or "hollow." *Utsubo* is a kind of a hollow bag, and was used for holding arrows by Samurai in old Japan. Both words have often been used to describe a cavity in an old holy tree in some Japanese myths (Ishigami 1992). Since *fune* means "ship" or "boat," *Utsuro-fune* and *Utsubo-fune* have the same meaning, i.e., "hollow boat" (ship). It is apparent that these words are based on the structure of dugouts used in ancient times.

Yanagida Kunio (1875–1962), who was the great folklorist in Japan, published a paper entitled "The Story of Utsubo-fune" in 1925 (Yanagida 1962). He was so famous as a folklorist that his complete works can be found in almost every university and public library in Japan. In his paper, he introduced many folklore of *Utsubo-fune.* For example, he presents a typical folklore which states the origin of a Kawano family in Iyo district (present Ehime Prefecture) as follows:

> A long time ago, a fisherman named Wakitaro living on Gogono Island was working on the sea. He found a *Utsubo-fune* on the sea and he towed it to his home. He found a girl whose age was about twelve or thirteen inside this boat. She told him that she was a daughter of a king in China. Since she was involved in a scandal in her homeland, she was forced out to sea in this boat. The fisherman named her Wake-hime and brought her up. She later became a princess of a king in Iyo district and gave birth to Ochimiko, who was the beginning of Kawano family.

In his paper, we can find another interesting folklore that has been handed down as a song in Kyushu Island (figure 4). This song contains many phrases similar to those in the story *Toen Shousetsu:* ". . . a daughter of a noble man . . ."; ". . . she

was sent into the sea in an *Utsuro-fune* because of her scandal . . . "; ". . . the boat was made of red sandalwood, ebony, and Chinese wood . . ."; ". . . the glass (window) was shielded with *chan* . . ."; ". . . it was possible to distinguish between day and night through the glass (window). . ."; ". . . the food in the boat was delicious cake . . .", etc. In some folklore, the boat is eventually forced to be sent away.

Yanagida Kunio has also referred to the story of *Toen Shousetsu*, and he concluded in his 1925 paper that the story is definitely fiction (Yanagida 1962). The basis of his conclusion are as follows:

(1) Apparently, the story is based on folklore that has been handed down in many parts in Japan. People will easily believe this story because they have always heard similar stories elsewhere.

(2) The characters found inside the boat (see figure 1) do not correspond to any language in the world.

(3) At the end of the story the boat is eventually sent out to sea with the woman inside. The story was constructed so that no one can verify this incident later.

(4) The features of the woman in the boat are very similar to those of a Western white woman. At that time, Japanese were afraid of Western countries such as Russia, Britain, and the U.S.A.

Figure 3. Illustration in *Ume no Chiri* depicting a mysterious woman and vehicle.

directly faces the Pacific Ocean as shown in figure 4. Given this information, it is reasonable to conclude that "Haratono-hama" or "Hara-yadori" existed on the eastern long seashore of Hitachi state in 1802.

We next check the names of *Ogasawara Izumi* or *Ogasawara Etchuu-no-kami*, whose territory encompasses the area in question. The family name Ogasawara shows that he was in the Guards Division called "Hatamoto" of Tokugawa family i.e., Shogun family. The biographical histories of "Hatamoto" have been well recorded in Japan and its document has been published (Ishii and Ogawa 1989). The name *Ogasawara Izumi* written in *Ume no Chiri* can be found in this record, but he had no territory in Hitachi state. We can find the name of *Ogasawara Etchuu-no-kami* and find that his position was "Yoriai" in Tokugawa shogunate with 4500 *koku* in 1799 in this record. We can also find that he had territories in Hitachi state. These documents agree well with the story of *Toen Shousetsu*. So we can conclude that *Ogasawara Etchou-no-kami* really existed in 1803 and had territories in Hitachi state.

Now to identify the positions of his territories in Hitachi state. Territory names and lord names of the territories in Tokugawa period have been well recorded in official documents (Kimura 1980). We can easily find his three territories in Hitachi state. However, all his territories were inland and do not face the Pacific Ocean. Furthermore, no places whose names resemble *Haratono-hama* or *Hara-yadori* can be found in his territories. They are not found in Hitachi state in a geographical record of Tokugawa period (Shitanaka 1988), nor are they found in a famous large Japanese geographical dictionary first published in 1907 (Yoshida 1992).

These facts suggest that Haratono-hama or Hara-yadori vanished in Japan before 1907 or that they did not exist. Place names in the Tokugawa period have been well recorded in many documents in Japan. When the place name was changed, the original names can still be traced in the records (Shitanaka 1988). It is difficult to believe that these place names, where an amazing incident occurred, vanished between 1803 and 1907 with no trace even in the Tokugawa period. The only reasonable conclusion is that these names are imaginary.

If we assume that the story is a fiction, we understand that

## Identification of the Incident's Location

Yanagida's conclusions are persuasive. When we try to identify the exact place of the incident in Japan, his conclusions are further supported. To find the exact place where the boat drifted ashore, the following place names can be used:

(1) Haratono-hama[2] in a territory of *Ogasawara Izumi* in Hitachi state. (*Ume no Chiri*)

(2) A beach called Hara-yadori in a territory of Ogasawara *Etchou-no-kami* in Hitachi state with 4000 *koku*. He had occupied a position named "Yoriai-seki" of Tokagawa shogunate. (*Toen Shousetsu*)

Since the word *hama* in Japanese means "beach" in English, "Haratono-hama" would face the sea. The word *yadori* means "stay" or "stay in shelter." In an old geographical dictionary (Shitanaka 1983) we can find the place name of "Yadori-shima (Island)" which was used as a port. So, "Hara-yadori" would also face the sea. The eastern border of Hitachi state, which is present Ibaragi Prefecture in Honshu Island,

the writer cleverly mixed both imaginary and real names of persons and places to give credibility to the story. Later investigators cannot quickly or easily verify the story due to the imaginary names. This kind of technique is often used in modern April Fool's stories.

## Illustrations of the Strange Boats

The last mystery is the illustrations of strange boats. According Yanagida's theory (Yanagida 1962), in the early version of the folklore, the boat was a simple dugout which is presently used in southern Asia. However, as time went on, people forgot the original shape of the dugout. To give credibility to the story, people had to improve the boat in the folklore because skeptics claimed that it would be impossible to travel across such a long distance in the ocean in a simple dugout. So, the roof (or the cover with windows) was added to the simple dugout. It is not difficult to consider that, as time went on, a simple dugout eventually became a hollow boat with glass windows and a reinforced structure as shown in figures 2 and 3.

It is unreasonable to assume that the boats as shown in figures 2 and 3 resemble modern UFOs. In the stories the boat did not fly and did not even move by itself on the sea. Some parts of the boat were reinforced by the iron plates. This means that most parts of the boat were made of wood. The boat was constructed by the technology within human imaginations at that time.

Some UFO believers may claim that while the stories may be fictions, the illustrations of the boats may be based on a real UFO observed in the Tokugawa period in Japan. However, we can find no evidence that supports this claim. We notice that the boat structures as shown in figures 2 and 3 are consistent with the folklore data—remember the phrase ". . . it is possible to distinguish between day and night through the glass (window) . . ." in a song from Kyushu Island. Applying Occam's razor, we can conclude that the resemblance between them and modern UFOs is accidental (Kamon 1998).

## Conclusion

No records of the mysterious incident have been found in official documents in Japan. Hitachi state was not far from the capital Edo (Tokyo) and faced the Pacific Ocean (see figure 4). The beach in this state was very important for national security in the Tokugawa period (1603–1867). Therefore, most parts of eastern border of Hitachi state were occupied by the Mito-Tokugawa family who were the relatives of the Tokugawa (Shogun) family (Kimura 1980). It is unrealistic to believe that an amazing incident involving a strange boat and a woman on a beach in Hitachi state has not been recorded in any official documents of the Tokugawa period.[3]

Japan was closed to foreign countries during the Tokugawa period (1603–1867). After 1800, however, Western ships occasionally invaded Japan. Japanese were afraid—yet fascinated by—the outer world, especially Western countries, during this period.

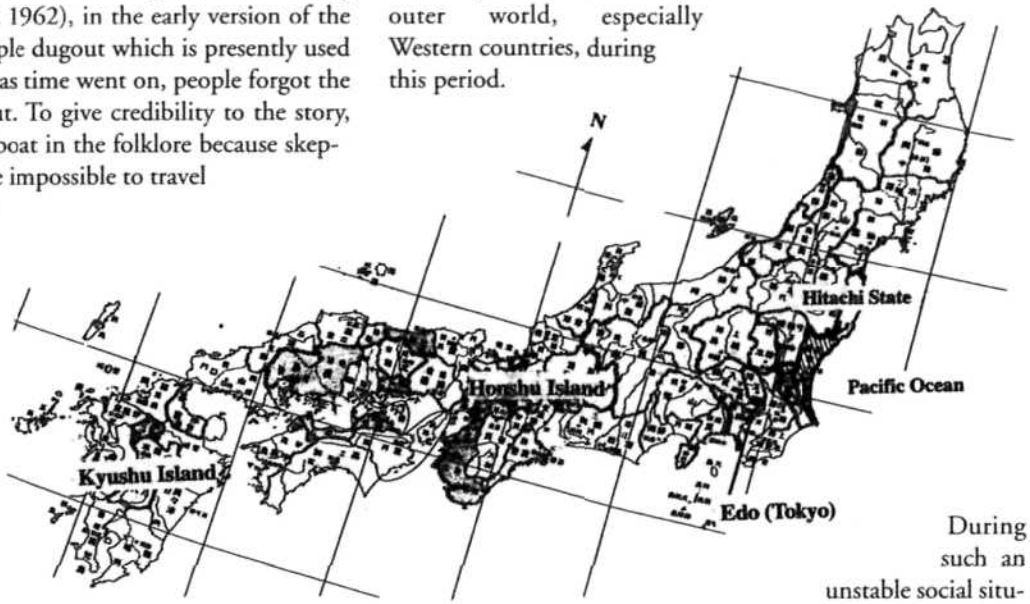

Figure 4. Japanese map in the Tokugawa period.

During such an unstable social situation, people in Edo were interested in paranormal phenomena such as ghosts, monsters, ball lighting, etc., according to the records at that time (NHK Shuzai-han 1997). An unknown, clever writer might use a Western white woman in the folklore of *Utsuro-fune.*

Intriguing stories written in Japanese books published in 1825 and 1844 are apparently fictions based on Japanese folklore. The illustrations in these books are the results of a combination of the folklore and imagination.

## Acknowledgments

I would like to thank librarians of Ibaragi Prefecture Library in Mito City in Japan for valuable information about the incident and Ms. Hisae Nagadome, who was a director of Tsushima Historical and Folklore Museum, for valuable information concerning "Utsuro-fune." I also thank Mr. Ryutaro Minakami, who is chairperson of Japan Anti-Pseudoscience Activities Network (JAPAN), Mr. Toshihiro Kimoto, and Mr. Tsugio Satou for their encouragement and stimulating discussions.

## Notes

1. The word *koku* is a unit of volume measuring a quantity of rice-seeds, i.e., tax, in the territory used in Tokugawa period.

2. In *Ume no Chiri*, "Haratono-Hama" written in Chinese (ideogram) and the reading at its side written by *kana* (phonogram) can be found. In *Toen*

*DID A CLOSE ENCOUNTER OF THE THIRD KIND OCCUR ON A JAPANESE BEACH IN 1803?*
*Continued on page 60*

# Rethinking the Dancing Mania

*While medieval dance frenzies have long been regarded as a classic example of stress-induced mental disorder affecting mostly women, there is much evidence to the contrary.*

ROBERT E. BARTHOLOMEW

Pick up a textbook on abnormal psychology and in the first chapter you are likely to find a discussion of the dance manias. Also known as St. Vitus's dance, between the eleventh and seventeenth centuries, manias swept across Europe as tens of thousands of people participated in frenzied public orgies and wild dances lasting for days and sometimes weeks. It is little wonder why psychiatrists and medical historians classify such episodes as group mental disorder affecting those overwhelmed by the stresses of the period. During outbreaks many immodestly tore off their clothing and pranced naked through the streets. Some screamed and beckoned to be tossed into the air; others danced furiously in what observers described as strange,

Religious fanatics dancing amid graves in a churchyard. From a German engraving, about 1600.

colorful attire. A few reportedly laughed or weeped to the point of death. Women howled and made obscene gestures while others squealed like animals. Some rolled themselves in the dirt or relished being struck on the soles of their feet. An Italian variant was known as tarantism, as victims were believed to have been bitten by the tarantula spider, for which the only cure was thought to be frenetic dancing to certain music which supposedly dissipated the "poison" from their blood (Hecker 1844; Rosen 1968; Sirois 1982).

The term "dancing mania" is derived from the Greek word *choros*, a dance, and *mania*, madness. The literal translation of *choros mania* is dancing madness. The name was adopted after a group of about 200 people danced so spiritedly on a bridge above the Maas River in Germany during 1278 that it collapsed, killing many participants. Survivors were treated in a nearby chapel dedicated to St. Vitus, and many were reportedly restored to full health. Prior to the twentieth century it was commonly referred to as epidemic chorea or choreomania. The word *chorea* was erroneously evoked to describe these behaviors, as participants were often thought to be exhibiting symptoms of chorea, a central nervous system disorder characterized by brief irregular jerking movements which can resemble dancing.

The terms *tarantism* and *dancing mania* are often used interchangeably as they share overlapping features. Tarantism was mainly confined to southern Italy. Gloyne (1950, 29) describes it as the "mass hysterical reaction" to perceived bites of the tarantula spider. The first recorded episodes appeared during the thirteenth century and persisted on a widespread scale in southern Europe for 400 years, reaching a peak in the seventeenth century, after which it virtually disappeared. Small annual episodes have persisted in southern Italy well into the twentieth century. Hans Schadewaldt (1971) investigated an outbreak in Wardo during 1957. Italian religious history professor Ernesto de Martino (1966) identifies thirty-five cases of tarantism near Galatina in 1959. De Martino conducted his survey between June 28 and 30, as June 29 is the festival day of St. Peter and St. Paul. On that day it is customary for the "victims" to travel from regional villages to the chapel of St. Paul to obtain a cure for various ailments. More recently, it has been observed near Sardinia, Italy (Gallini 1988).

Medieval tarantism was reported almost exclusively during the height of the hot, dry summer months of July and August:

> People, asleep or awake, would suddenly jump up, feeling an

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> acute pain like the sting of a bee. Some saw the spider, others did not, but they knew that it must be the tarantula. They ran out of the house into the street, to the market place dancing in great excitement. Soon they were joined by others who like them had just been bitten, or by people who had been stung in previous years, for the disease was never quite cured. The poison remained in the body and was reactivated every year by the heat of summer. . . .
>
> . . . Music and dancing were the only effective remedies, and people were known to have died within an hour or in a few days because music was not available (Sigerist 1943, 218–219).

Symptoms included headache, giddiness, breathlessness, fainting, trembling, twitching, appetite loss, general soreness, and delusions. Sometimes it was claimed that a sore or swelling was caused by a tarantula bite, but such assertions were difficult to verify because the bite resembled those of insects. The dance frenzy symptoms resemble typical modern episodes of epidemic hysteria, in addition to expected reactions from exhaustive physical activity and excessive alcohol consumption.

Psychiatrists classify tarantism as a form of epidemic hysteria due to its psychological character and claims that most of those affected were females (Sigerist 1943, 218; Rosen 1968, 204). Early medical observers theorized that a venomous species of tarantula found only near the Italian state of Apulia was capable of producing sporadic tarantism symptoms each summer, but tests on spiders of the region have failed to substantiate these suspicions (Gloyne 1950, 35). *Latrodectus tarantula* is a nonaggressive, slow-moving spider common in Apulia that can produce psychoactive effects in people it bites. In severe cases, it may temporarily mimic many tarantism symptoms, including twitching and shaking of limbs, weakness, nausea, and muscular pain (Lewis 1991, 514). Ironically, *Lycosa tarantula* was typically blamed for tarantism symptoms, as it is larger, more aggressive, ferocious in appearance and has a painful bite. Yet neither spider can account for the predominantly symbolic and psychogenic character of tarantism attacks. *Latrodectus tarantula* is also found in other countries where tarantism does not occur (Russell 1979, 416), including the United States (Lewis 1991, 517). There is no evidence that a venomous species of tarantula, native only to Apulia, may have existed during this period and later died out. As Sigerist (1943, 221) remarks: "The same tarantula shipped to other parts of the country seemed to lose most of its venom, and what remained acted differently." It is also doubtful that some insect or other agent was responsible for causing "attacks," as most participants did not even claim to have been bitten, and would only participate in tarantism episodes at designated times.

Clearly most cases were unrelated to spider bites. Other psychological aspects include the only reliable cure: dancing to certain types of music. "Victims" would typically perform one of numerous versions of the tarantella, a rapid tempo score characterized by brief, repetitive phrases which escalate in intensity. Such performances also allowed "victims" to exhibit social behavior that is prohibited at any other time. Dancing persisted intermittently for hours and days, sometimes lasting weeks. Participants would eventually proclaim themselves "cured" for the remainder of the summer, only to relapse in subsequent summers. Many "victims" believed they had been infected from those who had been bitten, or from simply brushing against a spider. All that was needed to "reactivate" the venom was to hear the strains of certain music being played to cure those who had already been bitten.

## Dancing Manias

A variation of tarantism spread throughout much of Europe between the thirteenth and seventeenth centuries, where it was known as the dancing mania or St. Vitus's dance, on account that participants often ended their processions in the vicinity of chapels and shrines dedicated to this saint. Like its Italian counterpart, outbreaks seized groups of people who engaged in frenzied dancing that lasted intermittently for days or weeks. Social scientists typify victims as females who were maladjusted, deviant, irrational, or mentally disturbed. These activities were typically accompanied by symptoms similar to tarantism, including screaming, hallucinations, convulsive movements, chest pains, hyperventilation, crude sexual gestures and outright intercourse. Instead of spider bites as the cause, participants usually claimed that they were possessed by demons who had induced an uncontrollable urge to dance. Like tarantism, however, music was typically played during episodes and was considered to be an effective remedy. Detailed accounts of many episodes appear in a classic book by German physician Justus Hecker, *Epidemics of the Middle Ages* (1844). He considered the origin of these "epidemics" as due to "morbid sympathy" since they often coincided with periods of severe disease, such as widespread pessimism and despair after the Black Death (Hecker 1844, 87). This epic disease plague, which by some estimates killed half of the population of Europe, subsided about twenty years prior to 1374, the year that most scholars identify with the onset of the dance mania. Benjamin Gordon, in *Medieval and Renaissance Medicine* (1959, 562) describes the onset of the dance mania:

> From Italy it spread to . . . Prussia, and one morning, without warning, the streets were filled. . . . They danced together, ceaselessly, for hours or days, and in wild delirium, the dancers collapsed and fell to the ground exhausted, groaning and sighing as if in the agonies of death. When recuperated, they swathed themselves tightly with cloth around their waists and resumed their convulsive movements. They contorted their bodies, writhing, screaming and jumping in a mad frenzy. One by one they fell from exhaustion. . . .
>
> . . . Many later claimed that they had seen the walls of heaven split open and that Jesus and the Virgin Mary had appeared before them.

As with tarantism, dance manias are considered to have occurred spontaneously, with participants unable to control their actions, and being exhibited primarily by mentally disturbed females. Influential New York University psychiatrists Harold Kaplan and Benjamin Sadock (1985, 1227) state that they represent "collective mental disorder"; Carson et al. (1998, 37) view St. Vitus's dance and tarantism as collective hysterical disorders; while abnormal psychologist

Ronald Comer of Princeton University uses the term "mass madness" (1996, 9).

Let us examine these claims based on several dozen period chronicles translated by E. Louis Backman (1952) in his seminal study of religious dances. Few if any modern textbooks on psychiatry and abnormal psychology cite these early chronicles. Instead they rely on a handful of often-cited influential medical historians of the early twentieth century, using their assessments and well-worn quotations. Medical historians such as Henry Sigerist, George Mora, and George Rosen were giants in their field and astute enough acknowledge Greek or Roman ritualistic elements in the dance manias, but each assumes that the participants used these rites to work themselves into frenzied states of physical and mental disturbance in order to experience cathartic reactions to intolerable social conditions. They also assume that most participants were hysterics.

Mora (1963, 436–438) writes that tarantism and dance manias used rituals as psychotherapeutic attempts to cope with either individual or societal maladjustments which fostered mental disturbances. Sigerist held a similar view. An abnormal psychology text written by Robert Carson of Duke University and his colleagues (1998, 37) cites Sigerist to support the view that St. Vitus's dance and tarantism were similar to ancient Greek orgiastic rites which had been outlawed by Christian authorities, but were secretly practiced anyway. The authors assume that these "secret gatherings . . . probably led to considerable guilt and conflict" which triggered collective hysterical disorders. Dance frenzies appeared most often during periods of crop failures, famine, epidemics, and social upheaval, leading Rosen (1968) to conclude that this stress triggered widespread hysteria. Yet these same disasters prompted attempts at divine intervention through ritualized dancing, and often produced trance and possession states. Consistent with this latter view, many symptoms associated with tarantism and dancing mania are consistent with sleep deprivation, excessive alcohol consumption, emotional excitement and vigorous, prolonged physical activity. A German chronicle reports that during a dance frenzy at Strasbourg in 1418, "many of them went without food for days and nights" (Rust 1969, 20).

The European "dancing manias" and its Italian variant tarantism are portrayed within the psychiatric literature as spontaneous, stress-induced outbursts of psychological disturbance that primarily affected females. This depiction is based on the selective use of period quotations by medical historians such as George Rosen and Henry Sigerist, who were reflecting popular stereotypes of female susceptibility to mental disorders. However, based on a series of translations of medieval European chronicles describing these events, many of them first-hand, and by scrutinizing other historical sources which provide a degree of social, cultural, historical and political perspective, it is evident that contemporary depictions of "dancing manias" have been misrepresented. Contrary to popular psychiatric portrayals, females were not overrepresented among participants, episodes were not spontaneous but highly structured, and they involved unfamiliar religious sects engaging in strange or foreign customs that were redefined as a behavioral abnormality (Bartholomew 1998). Let us examine the evidence.

## Fallacy #1: Most "Dancers" Were Crazy

Period chronicles reveal that most participants did not reside in the municipalities where they occurred, but hailed from other regions, traveling through communities as they sought out shrines and churchyards to perform in. As a result, they would naturally have had unfamiliar customs. The largest and best documented dance plague, that of 1374 involving throngs of "dancers" in Germany and Holland, were "pilgrims" who traveled, "according to Beka's chronicle, from Bohemia, but also from Hungary, Poland, Carinthia, Austria, and Germany. Great hosts from the Netherlands and France joined them" (Backman 1952, 331).

The behavior of these dancers was described as strange, because while exhibiting actions that were part of the Christian tradition, and paying homage to Jesus, Mary, and various saints at chapels and shrines, other elements were foreign. Radulphus de Rivo's chronicle *Decani Tongrensis* states that "in their songs they uttered the names of devils never before heard of . . . this strange sect." Petrus de Herenthal writes in *Vita Gregorii XI*: "There came to Aachen . . . a curious sect." The *Chronicon Belgicum Magnum* describes the participants as "a sect of dancers." The actions of dancers

were often depicted as immoral, as there was much uninhibited sexual intercourse. The chronicle of C. Browerus (*Abtiquitatum et Annalium Trevirensium*) states: "They indulged in disgraceful immodesty, for many women, during this shameless dance and mock-bridal singing, bared their bosoms, while others of their own accord offered their virtue." In *A Chronicle of Early Roman Kings and Emperors*, it states that a number of participants engaged in "loose living with the women and young girls who shamelessly wandered about in remote places under the cover of night." If most of the participants were pilgrims of Bohemian and Czech origin as Backman asserts, during this period Czechs and Bohemians were noted for a high incidence of perceived immorality, especially sexual, including prostitution and annual festivals involving the free partaking of sex (Backman 1952, 290).

### Fallacy #2: There Was a Spontaneous, Uncontrollable Urge to Dance

Period chronicles reveal that dance manias were mainly composed of pilgrims engaging in emotionally charged, highly structured displays of worship that occasionally attracted locals. This social patterning is evident in a first-hand account on September 11, 1374, by Jean d'Outremeuse in his chronicle *La Geste de Liege*, who states that "there came from the north to Liege . . . a company of persons who all danced continually. They were linked with clothes, and they jumped and leaped. . . . They called loudly on St. John the Baptist and fiercely clapped their hands." Slichtenhorst (cited in Backman 1952, 210), in describing the dance frenzy of 1375 and 1376 in France, Germany, and Gelderland (now southwestern Holland), notes that participants "went in couples, and with every couple was another single person . . . they danced, leaped and sang, and embraced each other in friendly fashion."

A similar pattern is evident in tarantism. While *taranti* (as victims were known) are typically described as participating in uncontrollable behaviors in chaotic, frenzied throngs, adherents worshiped in a set pattern, much like modern-day ecstatic religious sects. Australian medical historian and tarantism expert Jean Russell states that *taranti* would typically commence dancing at sunrise, stop during midday to sleep and sweat, then bathe before the resumption of dancing until evening, when they would again sleep and sweat, consume a light meal, then sleep until sunrise. This ritual was usually repeated over four or five days, and sometimes for weeks (Russell 1979, 413).

Clearly tarantism episodes were not spontaneous, and the same is true of dance manias. German magistrates even contracted musicians to play for participants and serve as dancing companions. The latter was intended to reduce injuries and mischief during the procession to the St. Vitus chapel (Hecker 1970 [1837], 4). Hecker states that the dancing mania was a "half-heathen, half-Christian festival" which incorporated into the festival of St. John's day as early as the fourth century, "the kindling of the 'Nodfyr,' which was forbidden them by St. Boniface." This ritual involved the leaping through smoke or flames, which was believed to protect participants from various diseases over the ensuing year. A central feature of the dance frenzy was leaping or jumping continuously for up to several hours through what they claimed were invisible fires, until collapsing in exhaustion.

Not only were episodes scripted, but dance processions were swollen by spectators (Hecker 1970 [1837], 4), including children searching for parents who were among the dancers, and vice versa (Haggard 1934, 187). Some onlookers were threatened with harm for refusing to dance (Backman 1952, 147). Many took part out of loneliness and carnal pleasures; others were curious or sought exhilaration (Rust 1969, 22). Hecker remarks that "numerous beggars, stimulated by vice and misery, availed themselves of this new complaint to gain a temporary livelihood," while gangs of vagabonds imitated the dance, roving "from place to place seeking maintenance and adventures." Similar observations have been noted of tarantism episodes.

### Fallacy #3: Most "Dancers" Were Hysterical Females

A revisiting of the descriptions of dancing manias based on early chronicles of these events shows that both men and women were equally affected. Where the gender of the participants was noted, the following comments are representative: Petrus de Herenthal's chronicle *Vita Gregorii XI* remarks that "Persons of both sexes . . . danced"; Radulpho de Rivo's *Decani Tongrensis* states, "persons of both sexes, possessed by devils and half naked, set wreathes on their heads, and began their dances"; Johannes de Beka's *Canonicus Ultrajectinus et Heda, Wilhelmus, Praepositus Arnhemensis: De Episcopis Ultraiectinis, Recogniti*, states that in 1385, "there spread along the Rhine . . . a strange plague . . . whereby persons of both sexes, in great crowds . . . danced and sang, both inside and outside of churches, till they were so weary that they fell to the ground"; according to *Koelhoff's Chronicle* published in 1499, "Many people, men and women, old and young, had the disease [of dancing mania]"; Casper Hedion in *Ein Ausserlessne Chronik von Anfang der Welt bis auff das iar nach Christi unsers Eynigen Heylands Gepurt M.D.* writes that in 1374 "a terrible disease, called St. John's dance . . . attacked many women and girls, men and boys"; A. Slichtenhorst's *Gelsersee Geschiedenissen* states that "men and women were smitten by the fantastic frenzy." This gender mixture is also reflected in more recent tarantism reports such as episodes in the vicinity of Sardinia, Italy, studied by Gallini (1988) which found that the vast majority of "victims" were male, while de Martino (1966) reported that most participants that he investigated near Apulia were female.

### What Caused the Dancing Manias?

Ergot poisoning (pronounced "er-get") has been blamed for hallucinations and convulsions accompanying the dance mania. Nicknamed St. Anthony's Fire, ergotism coincided with floods and wet growing seasons which fostered the growth of the fungus *claviceps purpura* which thrives in damp conditions and forms on cultivated grains, especially

rye. While this could account for some symptoms, many outbreaks did not coincide with floods or wet growing or harvest periods. Convulsive ergotism could cause bizarre behavior and hallucinations, but chronic ergotism was more common and typically resulted in the loss of fingers and toes from gangrene, a feature that is distinctly not associated with dance manias (Donaldson et al. 1997, 203). As for tarantism, most episodes occurred only during July and August and were triggered by real or imaginary spider bites, hearing music, or seeing others dance, and involved structured annual rituals. Also, while rye was a key crop in central and northern Europe, it was uncommon in Italy. Surely a few participants were hysterics, epileptics, mentally disturbed, or even delusional from ergot, but the large percentage of the populations affected, and the circumstances and timing of outbreaks, suggests otherwise. Episodes were pandemic, meaning that they occurred across a wide area and affected a very high proportion of the population (Lidz 1963, 822; Millon and Millon 1974, 22).

So what is the most likely explanation for dance manias? Based on an examination of a representative sample of medieval chronicles, it is evident that these episodes are best explained as deviant religious sects who gained adherents as they made pilgrimages through Europe during years of turmoil in order to receive divine favor. Their symptoms (visions, fainting, tremor) are predictable for any large population engaging in prolonged dancing, emotional worship, and fasting. Their actions have been "mistranslated" by contemporary scholars evaluating the participants' behaviors *per se*, removed from their regional context and meaning. Tarantism was a regional variant of dancing mania that developed into a local tradition, primarily in southern Italy.

In reviewing the dance frenzies, it is important to consult original sources and realize that we are all to some extent products of our social, cultural, and historical milieu. When assessing the normality of a particular act, it is vital not to focus solely on the behaviors *per se*, but on the context of the participants and those making the evaluations. It is not that these prominent historians were trying to deceive, but their social and cultural milieu was different from our own. They had different assumptions and worldviews, and were writing at a time when it was taken for granted that women were innately susceptible to hysteria and were both physically and emotionally frail (Smith-Rosenberg 1972; Ehrenreich and English 1978; Micale 1995). This situation affected their selective readings of medieval chronicles despite their scholarly backgrounds and evidence to the contrary in the very texts they translated.

That a person's milieu affects their scholarship is not surprising. Of concern is the persistence of several fallacies about dance manias into the last decade of the twentieth century, and the reliance on secondary sources by the authors of many textbooks on abnormal psychology and psychiatry. In their defense, unless they are specialists in medieval manuscripts, most of these authors would lack the time or resources to consult original, obscure texts. This underlines the importance of consulting original sources whenever possible, and not relying solely on the interpretation of others.

Scientific progress and understanding is achieved by standing on the shoulders of giants. But occasionally those shoulders unwittingly face in the wrong direction. It is time to correct that mistake. One cannot help wondering how many more "facts" of today are based on the prejudices of yesterday, and will eventually be exposed by revisiting original sources as the fallacies of tomorrow.

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# Has Science Education Become an Enemy of Scientific Rationality?

*Despite the highest levels of general science education in history, distrust of science seems on the rise and the pseudosciences are flourishing. Students may reveal why this paradox exists.*

ANDREW EDE

In the industrialized world, science education grew in fits and starts from 1900 and then underwent explosive growth after 1945. A number of commentators have pointed out that there are more scientists alive today than the total number of scientists in history to 1900. In fact, to understand the scope of change, with the American Chemical Society approaching the 160,000-member mark, there are more *chemists* working today than all the scientists of the past combined. This has only been made possible by the expansion of science education.

One of the most significant developments in science education has been the almost universal introduction of general science in the public school systems. In the industrialized

world while some poorer school districts may be unable to administer science curriculum (or any other), in general every student in the public systems has been taught some general science. At the college and university level it is now common to have science as a breadth requirement for all undergraduates. Science education has never been more available, and the demand for students trained in scientific and technical skills has never been higher.

This leads to an interesting paradox: How then are we to reconcile having the most scientifically trained society in history with the persistence of irrationality? Why do we not see a significant drop in irrationality corresponding to the significant increase in the levels of general science education in the last fifty years?

Part of the answer may be a matter of perception. The level of irrationality may actually be dropping, but events like the continued battle over evolution in biology curriculums, the notoriety of spoon-benders, and the profusion of advertisements for psychic hotlines may leave us with the impression that irrationality is on the rise when it is simply more public. We may also feel that people in the past did not have access to the kinds of information we have today, which makes irrationality in our age seem more outrageous than in times past. This does not, however, explain why CSICOP is not slowly waning for lack of things to investigate.

To explore the paradox of irrationality in a scientific age, I turned to my students. My history of science classes draw from a large undergraduate community and as such I get a great cross section of science interest, from complete fear and loathing to science as a preferred career. My classes also cover first- to fifth-year students, and almost all of them have had one or more years of general science in high school.

I have always posed the same question at the beginning of each term: What is science? What starts as a seemingly mundane question leads to a lively discussion as students with very different perspectives grapple with the question. I have compiled a typical list of responses.

Science is:

1. A systematic study
2. The study of the natural world
3. Empirical
4. A method that follows a repeatable system
5. A system of hypotheses and experiments
6. What science students study (and arts students avoid)
7. About what is real
8. Knowledge of the physical world
9. A way of investigating that uses scientific method
10. What scientists do for a living

This is a bit of a trick question, since the definition of science has been hotly debated by philosophers, historians, and scientists for over two thousand years. Whole books are written on the topic "what is science?" Yet the frequent repetition of certain ideas can tell us about the perception of science by a group that will be socially important. The university student of today will be the executive, manager, scientist, teacher, parent, or politician of tomorrow.

The first thing that is obvious is that no single, simple definition of science covers all of scientific activity and excludes non-scientific activity. Landscape painters, for example, are frequently systematic and spend much of their time studying nature. Some of the answers are also historically contingent, which is a problem. What we think we know about physics is significantly different from what Aristotle and Newton knew. Does that mean that Aristotle and Newton weren't part of the scientific tradition because they got some things wrong? While we might disqualify Aristotle as being a philosopher rather than a scientist, Newton was clearly part of the scientific community, so merely getting things wrong does not exclude someone from science.

The second aspect of the definition problem is that there are really three categories of definition in the list. The first is the object of study, the second is the method of study, and the third is the community of practitioners. The responses are grouped in table 1.

| Object of Study | Method of Study | Community of Practitioners |
|---|---|---|
| The study of the natural world | A systematic study | What science students study |
| | Empirical | What scientists do for a living |
| About what is real | Follows a repeatable system | |
| | A system of hypotheses and experiments | |
| Knowledge of the physical world | Uses scientific method | |

Table 1. Criteria for defining a study as "science."

After discussing the problem of definition, I turn the question around and ask whether certain subjects are scientific. I write topics down and survey the class. While table 2 is not a rigorous statistical study, it does cast some light on why the problem of definition contributes to the uncertainty that even well-educated people have about what is scientific and what is not.

What the responses suggest is that we recognize science first and foremost by institutionalization. Physics, biology, and to a large extent psychology are all taught as sciences, in science departments by people who call themselves scientists. In other words, what makes something a science is the community of practitioners. History, ballet, and playing the violin don't fall into that category, so they are not included.

Political science and astrology are more difficult to identify as sciences by community. They both represent communities that make claims to professional status, but the practitioners of political science and astrology are clearly not in the same community as physicists and biologists. Political science is not in the science faculty and astrology has no departmental place at the university at all. What generally gains the votes of students for these two subjects as sciences is that they use a systematic approach, carefully recorded observations, and mathematical computation. Both also

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| Percentage who agree the subject is a science | | | |
|---|---|---|---|
| Subject | Mean | High response | Low response |
| Physics | 100 % | 100 % | 100 % |
| Biology | 100 | 100 | 100 |
| Psychology | 80 | 100 | 50 |
| Political Science | 60 | 80 | 30 |
| History | 10 | 30 | 0 |
| Beer making | 75 | 90 | 30 |
| Astrology | 20 | 60 | 2 |

Table 2. Students' responses on which pursuits are sciences.

engage in prediction, which is also strongly associated with scientific method. Further, since it has already been established that simply getting things wrong does not exclude a practitioner from science, astrology's failures can't be used to exclude it from consideration. Ergo, political science and astrology count as sciences because they fulfill a number of the important characteristics that students were taught are the methodological basis of science.

Beer making is always the subject that leads to the most discussion. On one hand, it is systematic, uses chemistry and biology, and (especially in industrial-scale beer production) employs professionals such as chemists, biologists, and engineers. Beer making then covers the methodology and community aspects of science, and at first glance also seems to be about natural operations. Yet after at least four thousand years of beer making, we have not created the single, correct formula. Students are quick to see this problem. We have only one type of gravity, one speed of light in a vacuum, one numerical value for pi, and while we might adjust our evaluations of these things, personal preference plays no role in the reality of nature. The true study of the beer maker is not invariant nature, but the palate of fickle humans. Beer making as a whole cannot be a science, but it is easy to understand why some students could reasonably argue that it was.

The responses of the students tell us that part of the problem of irrationality in a scientific era comes from the difficulty of identifying what counts as scientific. Since there is no simple definition of science, we rely on a hodgepodge of ancillary conditions to identify science. Students largely develop their sense of what science is from their personal experience of science education. If science education is the major conduit for scientific information and students demonstrate this much confusion, we can reasonably ask if there is something about science education that is contributing to the confusion and hence the persistence of irrationality. The years of discussion about science have led me to identify three issues that contribute to the problem of science education.

1. Science classes are primarily aimed at teaching students technical skills.

2. Science is taught with little or no social context.

3. Science education emphasizes elite behavior over concepts of a common good.

## 1. Technical training

The rationale for lab work is two-fold. First, students remember experiments better by doing them first-hand than by being lectured or reading about them. Second, hands-on training is part of the extensive system to produce competent scientists.

*Leaving aside the problem of the quality of instruction* where a poor teacher can suck the life out of even the most interesting subject, most students receive very mixed messages about the technical training of laboratory work. Students often have vivid memories of experiments (especially if they involved an open flame) and recall the events long after the larger point of the class is forgotten. They are also likely to recall the virtual necessity of fudging results. Fudging runs the gamut from reporting only the results that come the closest to the expected values to outright fabrication. Given this general condition, it is not hard to see why students might be cynical about experimental results. If even conscientious students must fiddle with their results to succeed, why shouldn't they suspect working scientists are doing the same? Inadvertently, technical training teaches students that experiments or experimental reporting can be manipulated to produce any desired result.

The second part of the problem is that most students do not plan on becoming scientists and so, after a certain point, continued technical training is wasted. Further, there is often little continuity between the technical training by subject; the skills in biology class seem unrelated to the skills being taught in a chemistry class. Since the technical training is designed to treat students as if they were protochemists or protobiologists, global concepts of science are replaced by institutional requirements. I have seen little evidence that students take their experimental skills outside the classroom unless they are pursuing the subject at higher levels. Ultimately, technical training in any particular discipline may actually impede an understand of science as a larger idea since subject specific skills present a divided, rather than unified, image of science.

## 2. Science Without Social Context

Science classes and science textbooks pay scant attention to the *reason* questions are asked. This is both an internal and external problem. Internally, students do not get to see that science is a living debate. Textbooks treat science as an artifact or end product with no room for argument and little hint that there was ever any argument about the "facts." This does not invite students into the subject, but rather favors a pedantic learning style.

Externally, students frequently have trouble understanding why some experiments or even concepts are important. Millikan's oil droplet experiment, a good high school level experiment to replicate, was about the charge of the electron, but why did anybody care? This problem can be seen in clear terms when it comes time for my students to write essays. The Manhattan Project is by far the most popular topic in my modern history of science courses. This is partly because the students have heard about the atomic bomb, but it is also because they can understand why the research was being done. Newton's optics, on the other hand, is not popular even though the resources are excellent and the technical issues are far less complex, which one might expect to appeal to students who lack a strong science background.

If students leave science class with no understanding of how scientific ideas were actually arrived at, or why science was done, it is not difficult to understand why many are susceptible to pseudosciences.

### 3. Science Education Emphasizes Elite Behavior Over Common Good

Teaching mixed classes of Arts and Sciences students quickly reveals the general attitude of the students. Science students regard themselves as the elite students. Arts students may beg to differ, but this perception is constantly reinforced on campus. Science has more money, higher salaries, higher entrance standards, and lower instructor-students ratios than Arts. There is far more funding for Science than Arts from outside sources. Even graduate fellowships in science are much more lucrative in general than those for students in the humanities, even though the cost of living is the same. In our world money is one of the greatest measures of status, and science has it.

Combine this with the stereotype of a good science student as one who is not merely smart, but must be brilliant to succeed. The popular image of the scientist is still essentially an individual genius, often lacking social graces and wearing a lab coat. The popular media coverage of the Nobel Prizes is an annual celebration of such individual achievement.

Most students do not believe that they are geniuses, and to them it therefore seems pointless to try and enter into the world of scientists. For the science community this is not a bad filtering method, since science has depended on the work of an extremely gifted group of workers for major developments. However, if science is viewed as only for the cognoscenti and science education is the means of filtering out the chaff, we should not be surprised if those excluded from the club have a negative attitude toward the subject.

These three problems combine to produce students whose exposure to science education can have almost the completely opposite effect of what was intended. For many students, especially those who do not excel at an early stage, science education teaches them to be cynical about the scientific community and confused about scientific concepts.

### A Proposed Remedy: The STS Model

It is an idea of the eighteenth century Enlightenment that education will lead to a rational world. Philosophers and reformers like Voltaire drew ideas about a rational and just civilization explicitly from science, especially from the work of Newton and Descartes. As a general appraisal, I would say the Enlightenment ideal has worked quite well. As such I would advocate the continued use of general science education in public education, but to increase the effectiveness of science education, we need to consider some changes to the method of instruction. Part of the underlying problem is our uncertainty about the overall objective of public education: Is school to prepare well-rounded citizens with a great breadth of general experience, or is it to train students for specific occupations? Most school systems try to do a bit of both, so I present a potential model that offers something to both objectives.

The Science, Technology, and Society (STS) model deemphasizes technical training until much later in the school system. Scientific concepts would be embedded in curriculum for primary levels, and students would be asked to think about how objects work or to investigate concepts in mathematics, physics, chemistry, and biology within the classroom environment. In many school jurisdictions this is already a part of primary school curriculum. At higher levels there would be STS courses which would introduce historical and contemporary ideas about science as well as the philosophical and social issues. They would also introduce students to science as a profession, building on the many science outreach programs that already exist. Scientists would visit the classroom to talk about their jobs, interests, and methods. The increasing resources on the Internet would fit perfectly with STS curricula at the higher levels, so that schools in places that don't have access to visitors could still interact with historians, philosophers, and scientists.

At the senior public and undergraduate levels, STS courses would continue, potentially leading to an undergraduate degree in STS as a subject area. A growing number of science-related professions such as patent law, science librarianship, science policy, and high-tech investment require a strong general knowledge of science rather than specific laboratory skills. Indeed, some aspects of technology are changing so rapidly that by the time material makes its way into the school system, it is out of date. The training I received in Fortran and Cobol (using punch cards!) in public school was largely time wasted that could have been spent on basic mathematics.

Laboratory courses would become available only at the senior high school level, giving those students who are actually interested in pursuing science as an educational and career path the opportunity to do so. Laboratory courses like Introductory Chemistry for Arts Majors and Rocks for Jocks would largely disappear at the undergraduate level, reserving teaching and material resources for the specialized students.

The objective of the STS model is to provide students with a very broad background in the idea of science before forcing them to make decisions about participation in the subject-specific skills of any particular discipline. Since it is also nearly impossible for the public school system to keep up with the skills being developed at the working end of science, it makes more sense even for science students to aim for as much flexibility as possible until they reach a level where resources are sufficient for more than nominal education. It also recognizes that most students will not choose science, but keeps the door open as long as possible. At the same time, STS aims to develop a citizenship that is both familiar with scientific concepts and able to participate in the increasingly technical issues of modern life.

The analogy for STS would be sport training. First introduce children to running, catching, and throwing, which are not specific to any one sport. Then let them see good players playing a number of sports so they have a sense of the game and at the same time introduce them to the rules. Only after that would you offer elite training to those who show talent and determination. But even if a child doesn't go into the sport, they will still understand it, and as fans perhaps even be passionate about it. To stretch the analogy a bit further, we have a large and growing professional science league, but what we need is a bigger base of knowledgeable fans. The STS model could offers students a much longer exposure to scientific ideas without some of the problems that driven many students out of science today. □

# Our Man in Washington

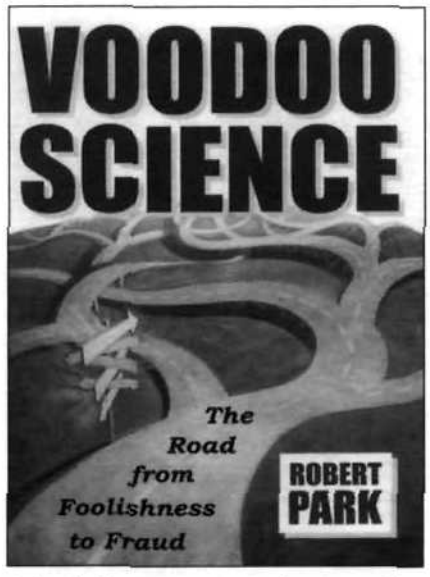
GERRY RISING

*Voodoo Science: The Road from Foolishness to Fraud.* By Robert Park. Oxford University Press, New York, London, 2000. ISBN: 0-19-513516-6. 256 pp. Hardcover, $25.

Is anybody out there listening? When scientists expose the nonsense inundating our society, why cannot we find our way out of the wilderness?

When Joe Newman and James Patterson independently develop energy-producing machines that break the fundamental laws of thermodynamics, when salt water is sold as Vitamin O with its "stabilized oxygen molecules," when Stanley Pons and Martin Fleischmann announce cold fusion, when homeopathic practitioners claim that water has memory, when power lines are designated cancer causes, and when magnets are proposed as health agents, our media communicators descend in force to provide glowing tributes. And when highly qualified scientists confront these activities for what they are, no retractions appear and often financial support continues to be misdirected.

But watch out, voodoo scientists. Better days may lie ahead. Robert Park, director of the Washington office of the American Physical Society as well as professor of physics and former chair of the University of Maryland Department of Physics, writes so well that things may indeed change. Increasingly, journalists as well as scientists are following his delightful weekly electronic column—to be found at www.aps.org/WN—and now they have this highly entertaining and yet remarkably fair book, *Voodoo Science: the Road from Foolishness to Fraud*, to turn to for background.




Park carefully defines his terms:

> Scientists, no less than others, are inclined to see what they expect to see, and an erroneous conclusion by a respected colleague often carries other scientists along on the road to ignominy. This is *pathological science*, in which scientists manage to fool themselves.
>
> If scientists can fool themselves, how much easier is it to craft arguments deliberately intended to befuddle jurists or lawmakers with little or no scientific background. This is *junk science*. It typically consists of tortured theories of what *could* be so, with little supporting evidence to prove that it *is* so.
>
> Sometimes there is no evidence at all. Two hundred years ago, educated people imagined that the greatest contribution of science would be to free the world from superstition and humbug. It has not happened. Ancient beliefs in demons and magic still sweep across the modern landscape, but they are now dressed in the language and symbols of science: a best-selling health guru explains that his brand of spiritual healing is firmly grounded in quantum theory; half the population believes Earth is being visited by space aliens who have mastered faster-than-light travel; and educated people wear magnets in their shoes to draw energy from the Earth. This is *pseudoscience*. Its practitioners may believe it to be science, just as witches and faith healers may truly believe that they can call forth supernatural powers.
>
> What may begin as honest error, however, has a way of evolving through almost imperceptible steps from self-delusion to fraud. The line between self-delusion and fraud is thin. Because it is not always easy to tell when that line is crossed, I use the term *voodoo science* to cover them all: pathological science, junk science, pseudoscience, and fraudulent science.

By dumping all these kinds of misdirection into the wastebasket of voodoo science, Park is able to avoid a confrontational approach. He doesn't need

*Gerry Rising, a retired State University of New York at Buffalo Distinguished Teaching Professor, writes a weekly "Nature Watch" column for* The Buffalo News. *Many of those columns are collected at www.acsu.buffalo.edu/~insrisg/nature/.*

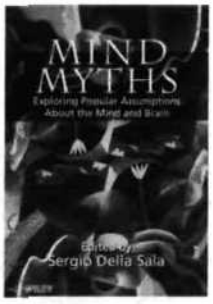
to tell us which are purposely fraudulent junk science—intelligent readers know full well!—and so in his presentation of evidence he doesn't come across as another of those ivory tower scientists protecting their own turf. In fact, what I find best about Park's exposés is his willingness to explore the dynamics of the many examples he provides and even to empathize with their proponents.

> It's the sort of story Americans love. A backwoods wizard who never finished high school makes a revolutionary scientific discovery. He is denied the fruits of his genius by a pompous scientific establishment and a patent examiner who rejects his application for a patent on "an unlimited source of energy" without even examining it, on the grounds that all alleged inventions of perpetual motion machines are refused patents. Not a man to be pushed around, Joseph Wesley Newman takes on the U.S. government, filing suit in federal court against the Patent and Trademark Office. It's the little man battling a gigantic, impersonal system.

What is saddest about many of the stories Park tells is their history in our nation's legislatures and courts. Congress makes laws that protect the discredited practice of homeopathy and other forms of "natural" medicine from regulation, it continues to push NASA to send men into space to perform tasks more suited to machines, it provides an often supportive forum for wrongheaded nonsense. Meanwhile, our juries, in emotional findings for those "little guys" who confront "mindless industry," turn science on its head. And still worse, our judges do little better in their response to patently false concepts.

If only this book could be made required reading for those called upon to make decisions about science, our political leaders and our journalists in particular, how well we would be served. Some of the stories Park tells you will find discouraging, but you will come away from this book feeling that science could not be better represented in Washington. He has already enjoyed at least one important if brief victory: his exposé led the FTC to shut down Rose Creek Health Products, the purveyors of Vitamin O—$20 vials of salt water posing as an oxygen enhancer that "maximizes your nutrients, purifies your bloodstream, and eliminates toxins and poisons." (Unfortunately, however, as Park has pointed out in a recent column, the product has reared its ugly head once again. It is being distributed through a new vendor.)

Sadly, some of Park's colleagues have expressed concern that his outspokenness could hurt physicists who have grants under governmental review. I hope that they are incorrect—we too often forget that, like Pogo's enemies, many of those government employees are us. But, whether they are right or not, I support Park's tongue-in-cheek disclaimer attached to his weekly reports: "Opinions are the author's and are not necessarily shared by the APS, but they should be."




# Neuromythologies

BENJAMIN RADFORD

*Mind Myths: Exploring Popular Assumptions About the Mind and Brain.* Edited by Sergio Della Sala. John Wiley and Sons, New York, 2000. ISBN 0-471-98303-9. 291 pp. Paperback, $38.95.

The human brain is perhaps the most fundamental, mysterious, and magical organ in the universe. It is the origin of thought, speech, movement, perception, music, and everything else that makes us human.

It is no wonder, then, that many myths and misperceptions have arisen surrounding the mind and brain. From information on how much of our brain we use to what the right and left hemispheres do, many people are quick to proffer fallacious "facts" gleaned from advertisements or backyard conversations. *Mind Myths* addresses these assumptions and many more.

From trendy "smart bars" hawking "memory boost" drinks to gadgets claiming to increase brain power, there is no shortage of unproven therapies to drain the wallets of uninformed consumers. Just pop a pill, down a drink, or put on special goggles, we're told, and you'll be smarter, faster, and better than ever before.

It is important to note that many of the myths demolished here are not esoteric, finer-point misunderstandings among brain-behavior scientists. These myths need to be challenged because they frequently form the basis for further, even more misguided beliefs and pseudosciences. A rolling pebble of misunderstanding tends to pick up further mistakes, incorrect inferences, leaps of logic, and outright lies as it tumbles, soon becoming a giant snowball of misinformation.

For example, the myth that people only use 10 percent of their brains is used to promote psychic powers. The myth of extreme laterality of brain function is used to promote expensive (and bogus) personal achievement programs and books, promising to provide "whole brain learning." And the myth of a "body" or "mind" energy is used to support psychic powers and bogus therapies aimed at removing "energy blocks."

Readers will find many names familiar to the skeptical movement among the contributors, including Barry Beyerstein, James Randi, Elizabeth Loftus, and Massimo Polidoro. Each writes within his or her specialty to

*Benjamin Radford is a writer and managing editor of the SKEPTICAL INQUIRER. He wrote on the myth that people only use 10 percent of their brains in the March/April 1999 issue.*

enlighten, entertain, and educate. The wide range of topics includes false memories, near-death experiences, placebo effects, and detecting psychic fraud.

In his chapter on hypnosis, Graham F. Wagstaff provides an eminently understandable definition (and demystification) of hypnosis: "any set of instructions or procedures that invite the subject to enact the role of someone who is 'hypnotized' as they understand the term. . . ." He also deflates the view that hypnosis *can be useful for enhancing memories of* witnesses in police investigations. Graham points out that instead of boosting the accuracy of recall, hypnosis only encourages a more lax criterion for reporting. Thus, "if any new information is produced, it is usually accompanied by an increase in incorrect information and an inflated level of confidence."

Explaining why popular assumptions are wrong frequently requires extensive discussion, and although the book at times gets technical, it rarely becomes laborious (although chapter 5, on near-death experiences, is a little tough going). The text gives thorough explanations and arms skeptics with more than enough information to challenge these mind myths wherever they may occur, be they about psychic claims or in an otherwise informed argument on left- and right-brain functions.

Many fascinating tidbits are to be found in the pages of *Mind Myths*. For example, at one point it was thought *that Egyptians were mostly left-handed* because of the right profiles found in their drawings. And the brain duality paradigm is apparently a cyclical phenomenon, one that had a heyday in the late 1800s—long before modern medicine could tease out the truth one way or the other.

The book's most glaring flaw is its illustrations. Interspersed with diagrams and charts are over two dozen cartoons depicting various mind myths. The art is painfully amateurish, and detracts from the credibility of the important, scholarly work surrounding it.

As the contributors of this remarkable book freely admit, there is much we don't know about the mind and brain. It is perhaps all the more important that we be sure of what we *do* know and not allow a "hijacking" of good science by the misinformed.

# A Challenge to Some Well-Accepted Beliefs

MARK DURM

*Three Seductive Ideas.* By Jerome Kagan. Harvard University Press, Cambridge, Massachusetts, 2000. ISBN 0-674-89033-7. 232 pp., Paperback, $14.95.

Ideas can seduce society. Ideas can seduce scientists. Ideas can even seduce skeptics. To this point, Jerome Kagan, a world-renowned developmental psychologist, writes, ". . . Sadly, the gut feeling that an idea is right is a poor guide to truth." Kagan, in this provocative and powerful work, challenges three well-respected and accepted beliefs. Not only does he challenge the gut feelings of social and behavioral scientists, but he bravely challenges the philosophical foundations upon which these sciences are built.

Just what are these three seductive ideas of which Kagan is skeptical? They are: (1) the universal appeal of psychological processes; (2) "infant determinism," and (3) the "pleasure principle" as the origin of moral behavior. He says *Three Seductive Ideas* was written with skepticism. His conclusions are: (1) that many psychological processes do not generalize broadly; (2) that most adaptive adult characteristics are not determined by experiences of the first two years; and (3) that the majority of our daily decisions are issued in the service of gaining or maintaining a feeling of virtue and not in gaining or maintaining pleasure.

I'll take up each of Kagan's challenges in order individually.

*(1) "Many psychological processes do not generalize broadly."*

*Mark Durm is a professor of psychology at Athens State University, Athens, Alabama.*

Kagan strongly believes, and offers ample documentation, that abstract processes such as intelligence, learning, communication, memory, depression, cooperation, avoidance, and fear are *not* measurable entities as usually considered by today's social scientists. Kagan writes ". . . if psychology (like philosophy) is to be informative, it has to descend from a *global to a more local level.*"

An example, according to Kagan, of an abstract psychological process that has been generalized too broadly is "fear." He believes that in everyday conversation certain words are used to ". . . stuff dissimilar phenomena into the same drawer for the sake of efficiency." For example, "fear" to a clinical psychologist or psychiatrist is a patient describing a phobia of restaurants while to a neuroscientist it is a rat freezing when a tone associated with shock is presented. Kagan believes that a problem with the scientific literature is that scholars use words and sentences in a global nature for the sake of efficiency. When "fear" is used to describe and measure many things that are dissimilar, it doesn't adequately describe or measure *a* thing. Therefore, "fear" should specify the class of agent (rats or humans), the context (a laboratory or a restaurant), and the source of the evidence (freezing to a tone or ordering from the menu). Thus, "fear" does not generalize broadly.

Another example of a psychologi-

cal process that has universal appeal is "intelligence." Kagan argues that "g" (general intelligence) has never been proven. He writes, "The defenders of g . . . fail to appreciate that organs and physiological systems develop independently. No single general factor can represent the growth rates of the diverse classes of cells, tissues, and organs in animals or humans. The description "intelligent" is frequently found in sentences that are indifferent to the age and background of the person (or sometimes the animal species) or the evidential basis for the assignment." Thus, again, a psychological process does not generalize broadly. Although Kagan never uses the two German terms, he argues that social and behavioral scientists deny the *zeitgeist* ("spirit of the time") and *ortgeist* ("spirit of the place") when defining the psychological processes they study.

*(2) "Most adaptive adult characteristics are not determined by experiences of the first two years."*

Kagan strongly argues against "infant determinism," the idea that the first two years of a human's life is a very critical period in development. Kagan writes, "To the disappointment of many, it has proven difficult to find critical periods in human development that are as robust as the discoveries with ducklings and kittens."

He adds:

> . . . the evidence does not support infant determinism. . . . The thousands of infants who will be born today across the world will experience very different environments in their first two years. Some will be raised by surrogate caretakers in kibbutzim; some will be cared for by grandmothers or older sisters; some will attend day care centers; some will remain at home with their mothers. Some will have many toys; some will have none. Some will spend the first year in a dark, quiet hut wrapped in old rags; some will crawl in brightly lit rooms full of toys, picture books, and television images. But despite this extraordinary variation in early experience, excluding the small proportion with serious brain damage or a genetic defect, most will speak before they are two years old, become self-conscious by the third birthday, and be able to assume some family responsibilities by age seven. The psychological differences among these children are trivial when compared with the long list of similarities.

Kagan doesn't deny that infant experiences have influence, but does deny the fixity of the first two years. He claims that good rigorous research does not support the proponents of connectedness who believe that early experiences will be neither transformed nor eliminated by later events.

There are, however, three aspects of human existence that Kagan does believe are very critical. They are birth order, identification, and historical era (again, historical era refers to the *zeitgeist* and *ortgeist* of an individual). He supports his belief in these three areas by quoting well-documented and rigorously researched studies.

*(3) "The majority of our daily decisions are issued in the service of gaining or maintaining a feeling of virtue."*

In this last challenge, Kagan refutes the "Pleasure Principle." This is the idea that when a person consciously selects one act over another, he does so to attain a conscious feeling of pleasure that originates in changes in one or several sensory modalities. Those who adhere to this concept believe that sensory pleasure is the basis of all morality, that is, a child experiences a reduction in fear and thus an increasing sensory pleasure when he conforms to adult demands. Over time, obeying family and community standards becomes a habit, a moral. Moreover, the pleasure principle postulates the continuist premise, which is evolutionary in nature. Darwin believed that *conscience* or *ethics* in humans was a product of the social behavior of animals. But *which* ethics of humans?

Kagan writes:

> Anyone with a modest knowledge of animal behavior and only minimal inferential skill can find examples of animal behavior to support almost any ethical message desired. Those who wish sanctify the institution of marriage can point to the pair bonding of gibbons; those who think infidelity is more natural can point to chimpanzees. If you believe that people are naturally sociable, point to baboons; if you think they are solitary, point to orangutans. If you believe sex should replace fighting, point to rhesus monkeys; if you prefer the father to be the primary caretaker, point to titi monkeys. If you believe that surrogate care is closet to nature, point to lionesses. If you are certain that men should dominate harems of beautiful women, point to elephant seals; if you believe women should be in positions of dominance, point to elephants. Nature has enough diversity to fit almost any ethical taste.

Kagan says that it is an error to assume that any human ethic is a clear product of some particular class of animal behavior.

How then does Kagan believe a human's conscience develops? He gives it a very cognitive orientation:

> The human capacity for a moral motive and its associated emotions took from our primate ancestry a keen sensitivity to the voice, face, and actions of others but added five unique abilities: (1) to infer the thoughts and feelings of others; (2) to be self-aware; (3) to apply the categories of good and bad events and to self; (4) to reflect on past actions; and (5) to know that a particular act could have been suppressed. The combination of these five talents created a novel system that first emerges in children in the second year and matures during the decade that follows.

Thus to Kagan, a neurological foundation shaped by familial and sociological expectations creates virtue in the human species.

In an epilogue, Kagan offers four constructive maxims for those who work in social and behavioral sciences: (1) *Full sentences, please*—meaning that social and behavioral scientists should state in more detail the specific form of the association between past and present in order to generally claim that early events must have some future consequences; (2) *A plenitude of procedures* that includes verbal statements,

observed behaviors, and measurement of central and peripheral physiology which should *all* be used when describing the habits, feelings, and contents of the mind; (3) *Consider categories* of qualitative aspects of individual differences as well as quantitative variations. For example, each current personality type should be replaced with categories that recognize the person's temperament, developmental history, and adult characteristics; and finally, (4) *acknowledge minds* by urging those who study humans to seek how the person interprets experience and the differences between experiences. Kagan believes that humans interpret change in complex, symbolic methods that are impossible in other animals.

Ideas *can* seduce, but scientists, society, and especially skeptics may be now less vulnerable, thanks to Jerome Kagan. May it be recognized that *feeling* an idea is right can be a poor guide to truth and that well respected and accepted beliefs should be challenged.

# Created Laws and Spiritual Machines

RUDOLPH MUSKA

*The Age of Spiritual Machines.* By Ray Kurzweil. Penguin, Putnam, New York. 297 pp. Hardcover, 1999, $25.95 ISBN 0-670-88217-8. Softcover, 2000, $20. ISBN 0-14-028202-5.

Kurzweil's *The Age of Spiritual Machines* is apt to leave the reader wondering whether it is science or fiction. Maybe it is best to classify it as science fiction without much of a plot. But this doesn't mean it isn't a fascinating, stimulating, and thought-provoking book. It issues from the pen, or I should say keyboard, of a scientist with impressive credentials, and he writes of far-out reaches of science with ease.

He reminds us, using awesome figures, of the magnitude and the smallness of the universe, time, space, living things, and so on. Kurzweil also inserts humor here and there to prevent the heavier stuff from boring us. And of course, this book tickles the imagination and makes one wonder—perhaps that is what it is supposed to do. Nevertheless, it is hard to avoid the judgment that it is written to impress the unsophisticated (in science, philosophy, computerization, astro- and microphysics), and thereby increase the readership.

But the part that disquiets this reviewer is that many readers will think the book is truly science. It *looks* like science, portraying Kurzweil's vision of the future as if inevitable and factual. Kurzweil believes that the human brain will be so enhanced that it will coalesce into and with computers, producing nanobot-infused super-beings. Since this will not happen to everyone (some choice is involved) humanity will bifurcate into "Moshes" and Nanobotic beings: those who "have it" and those who don't, those no longer needing a biological body and those of us who resist the transformation into computerized asexual and bisexual forms.

According to Kurzweil, the principle of exponentiality—applied to every level of reality, and to the evolution of the species—produces (or reduces humans to) creatures of computational technology. Biological evolution will inevitably move from living beings (carbon-based circuitry) to more or less nonbiological beings (with mechanical-electronic circuitry), and this will happen within a hundred years or less!

The main argument of the book has to do with his several "laws," which are stated so unequivocally that I fear that many readers will understand them to be actual and necessary laws of nature. To the extent to which the book pretends not to be fiction but a serious work, he could be doing disservice to scientific discourse and understanding.

In science, one does not simply create a law and then proceed to assume its validity. Talking about the "law of Time and Chaos," Kurzweil asserts that after thinking about the relationships between various trends, "it became apparent to me" that "time moves in relation to chaos, which allows us to state" the "law of Time and Chaos," after which he propounds two subsequent "laws."

Scientific laws do not come about this way. Scientific laws (1) describe the regularities found in nature—they do not *prescribe* what must happen; (2) permit reliable and empirical predictability; and (3) are questioned, analyzed, and tested by the scientific community. The laws of nature are not simply plausible conjectures that appear to someone to produce certain eventualities.

This is an intriguing book. Still, it leaves one concern. It tends to demean the importance of the contemporary individual's life, in part by reminding us that we are but specks of dust in contrast to the awesome universe out there. To the extent that we are entranced by this perception, it has the danger of beclouding the wonder and uniqueness of human existence, for while we are but a speck in comparison to the whole universe, we are of highest value *relative to the world that surrounds us.*

It may be possible that some highly enhanced chip-laced "thing-persons" might evolve in the distant future, but it is highly improbable that these creatures (from "the other side") will take the place of thinking, sentient, moral, aspiring, free, and responsible human beings in any time frame relevant to our lives. □

*Rudolph C. Muska is a professor emeritus of philosophy at Heidelberg College in Ohio, now living in Lakeland, Florida.*

# NEW BOOKS

*Listing does not preclude future review.*

***The Girl Who Gave Birth to Rabbits: A True Medical Mystery.*** **Clifford A. Pickover**, Ph.D. Prometheus Books, 59 John Glenn Drive, Amherst, NY 14228-2197. 2000. ISBN 1-57392-794-5. 232 pp. Softcover. $19. Pickover here tells the story of "history's most fascinating medical mystery," amazing reports that a young English woman named Mary Toft in 1726 gave birth to rabbits and other monstrous misfits. Pickover says Mary's story contains timeless themes of justice and morality, crime and punishment, and science and superstition. He says it is a metaphor for today's fringe science, from psychic surgery to goat-sucking chupacabras and, in general, hoaxes perpetuated in the name of science.

***The Psychic Battlefield: A History of the Military-Occult Complex.*** **W. Adam Mandelbaum.** St. Martin's Press, 175 Fifth Ave., New York, NY 10010. 2000. ISBN 0-312-20955-X. 336 pp. Hardcover. $26.95. An attorney, "psychic," and former intelligent agent who clearly believes in the reality of psychic powers and the ability of psychic spying here provides a 5,000-year "history of the saga of psychic espionage," including the CIA's "remote-viewing" experiments and the government's Stargate program. The author is cofounder of a remote-viewing research group. Lots of detail, but how reliable it all is without a more critical point of view is debatable.

***Rare Earth: Why Complex Life Is Uncommon in the Universe.*** **Peter D. Ward and Donald Brownlee**. Copernicus/Springer-Verlag, 175 Fifth Ave., New York, NY 10010. 2000. ISBN 0-387-98701-0. 333 pp. Hardcover. $27.50. A professor of geological sciences and a professor of astronomy argue that not only intelligent life, but even the simplest of animal life, are exceedingly rare in our galaxy and in the universe. They do not contend that life is rare—in fact they believe that life in the form of microbes or their equivalent is very common in the universe—perhaps more common than even astronomers Frank Drake and Carl Sagan envisioned. But they argue that the conditions necessary for the evolution and survival of higher life—considering everything from DNA to plate tectonics to the role of our Moon—are so complex and precarious that they are unlikely to arise in many other places, if at all.

***Riddle of the Bones: Politics, Science, Race, and the Story of Kennewick Man.*** **Roger Downey**. Copernicus/Springer-Verlag, New York, NY 10010. 2000. ISBN 0-387-98877-7. 216 pp. Hardcover. $25. Since the discovery of the bones of "Kennewick man" in eastern Washington state in 1996, the controversy over both the archaeological significance of the discovery and the rights of scientists to examine the bones has never let up. The author contends that it is wrong to portray this as another confrontation between science and superstition, "the individual's right to pursue knowledge freely blocked by a bureaucracy in service of a reactionary religious agenda." He says the reality is far more complex and ambiguous. "Kennewick Man's story embodies not only a conflict between science and religion but conflicts between scientists espousing radically different worldviews."

***The Roswell UFO Crash: What They Don't Want You To Know.*** **Kal K. Korff**. Dell/Random House, 1540 Broadway, New York, NY 10036. 2000. ISBN 0-440-23613-4. 318 pp. Softcover. $5.99. Mass-market paperback publication of Korff's highly skeptical 1997 book about Roswell (summarized by Korff in his article "What Really Happened at Roswell" in the July/August 1997 SKEPTICAL INQUIRER).

***The Truth Never Stands in the Way of a Good Story!*** **Jan Harold Brunvand**. University of Illinois Press, 1325 S. Oak Street, Champaign, IL 61820. 2000. ISBN 0-252-02424-9. 217 pp. Hardcover. $22.95. The nation's foremost expert on urban legends here explores the spontaneous germination of these bizarre yet plausible narratives that play on the fears and absurdities of modern life. He looks in detail at a dozen examples of this contemporary folklore, including the "Baby Roast," "The Missing Day in Time," and the "Legend of the Clown Who Cussed Kids." (To be reviewed in our next issue.)

*—Kendrick Frazier*

# ARTICLES OF NOTE

**Aveni, Anthony F. "Solving the Mystery of the Nasca Lines."** *Archaeology*, 53(3): 26–35, May/June 2000. Aveni introduces his theory to explain the mystery behind the Nasca lines on Peru's desert coast. Forget about runways for ancient astronauts, or even astronomical explanations, says Aveni, who marvels at the imaginative theories some people have concocted about Nasca. According to him, the lines are pathways and the ray centers somehow involved a ritualistic acquisition of water. Says Aveni, "The paths we have traced are capable of taking a walker . . . from one side of the pampa (arid plain) to the other." After finding many artifacts, and spending years learning about this ancient civilization, he concludes that this culture was not technologically advanced, and thus the lines cannot be looked at as "the product of a massive superhuman work effort undertaken as a single-minded grand project."

**Cohen, Patricia. "A Claim-Buster by Calling."** *The New York Times*, April 29, 2000. A profile of physicist Robert L. Park, author of the new book *Voodoo Science*. "Park is known as a gadfly, an indefatigable debunker of alien abductions, miraculous cures, infinite energy sources, and wasteful spending," writes Cohen. Park lists five subjects that he thinks every educated person should understand: Darwinian evolution, the Copernican solar system, the size of the universe, the laws governing the conservation of energy, and ratios. He says he wrote *Voodoo Science* to help the public understand what they should know about science, and what they should throw out.

**Gardner, Martin. "Kilroy Was Here."** *The Los Angeles Times Book Review*, March 5, 2000. Gardner reviews at length Susan Blackmore's latest book *The Meme Machine*. Richard Dawkins introduced the word "meme," short for "mimetics," a word denoting mimicry. "A meme," Gardner says, "is anything humans do or say that is not genetically determined and is passed from person to person by imitation or copying, such as the wish to 'have a nice day.'" One of Blackmore's theories is that there is no "self," but instead, "millions of memes shuffling about inside our skull." Gardner suggests that the notion of a meme is much too broad to be useful in explaining human thinking and behavior. "A meme is little more than a peculiar terminology for saying the obvious."

**Gugliotta, Guy. "Health Concerns Grow Over Herbal Aids."** *The Washington Post*, March 19, 2000, P.A1. Gugliotta discusses the dangers Americans face by having a rapidly expanding alternative health indus-

try, and a government that refuses to acknowledge the negative effects herbal aids are capable of. "Mounting evidence suggests that increasing numbers of Americans are falling seriously ill or even dying after taking dietary supplements that promise everything from extra energy to sounder sleep," he says. *The Washington Post* conducted the first nationwide survey pertaining to the potential dangers herbal aids can have. It found the results disturbing.

**MacKenzie, Debora. "Unnatural Selection."** *New Scientist*, April 22, 2000. "Forty-seven percent of Americans—and a quarter of college graduates—believe humans did not evolve, but were created by God a few thousand years ago," says MacKenzie. "Creation science is far from extinct . . . it's mutating and spreading." The article is a summary of the United States' history of creationism, from the 1920's Scopes Trial, to the recent Kansas School Board decision to teach only creationism, not evolution, in the curriculum.

**Reichhardt, Tony. "New Form of Hydrogen Power Provokes Scepticism."** *Nature*, 404:218, March 16, 2000. The energy company Blacklight Power, Inc. of Cranbury, New Jersey, claims to have created a novel form of hydrogen, which has many scientists skeptical. Much to the company's dismay, physicists are "dismissing the claim because it violates established laws of physics." Blacklight Power, Inc. is threatening to sue four physicists if they continue to belittle the science behind their claim.

**Scott, Eugenie. "Not (Just) in Kansas Anymore."** *Science*, 288:813–814, May 5, 2000. Science and Society Essay about the latest neocreationist tactic, to balance evolution with "evidence against evolution." Notes Scott, "Scientists unfamiliar with such 'evidence' soon discover that evidence against evolution is just a euphemism for creation science." She discusses the latest campaigns against evolution teaching in the United States, its historical and religious roots, and the newest creationism movement, "Intelligent design creationism," which stresses existential issues and claims that if evolution is true there is a substantial price to pay in loss of purpose and meaning of life. Scott says IDC appeals to nonliteralist Christians and is being promoted to intellectuals and to school boards for inclusion in the science curriculum "without having contributed anything substantial to our understanding of science or philosophy of science." She calls on scientists and educators to oppose antievolutionism. Otherwise, support for good science will be weakened and scientific literacy will be further reduced.

*—Jodi Chapman and Kendrick Frazier*

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   Antonio Damasio
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   Richard Panek
   Fourth Estate
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   Michael Light
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# Templeton and the AAAS

RALPH ESTLING

The American Association for the Advancement of Science has a problem. For the last four years it has been promoting a study known as the "Program of Dialogue on Science, Ethics and Religion." Naturally this involves a lot of deep thinking. But that's not the problem.

No, the problem is this: Over those four years the biggest contributor, in terms of cash, has been the John Templeton Foundation, an organization devoted to building and smoothing "a path of cooperation" between science and religion. To help smooth the path, each year the John Templeton people award $1,000,000—the largest award amount there is in science given as a prize—to the person who, in their opinion, has been the year's most outstanding science/religion road builder and path smoother. Often it is a scientist. This year's prize went, on March 22, to Freeman Dyson, a fine physicist and an interesting speculator on future events.

During the last four years the Foundation has given over $1 million to the American Association for the Advancement of Science's Program of Dialogue on Science, Ethics, and Religion. Just recently (the end of February) it occurred to the AAAS's physics section that getting a lot of money from the John Templeton Foundation may not be entirely a good thing. It has struck them that the Program's independence and consistency might, just possibly be—how can I put it?—compromised. How, you ask? Well, for example, several people serve on the advisory boards of both the AAAS's Program and the Foundation. It also turns out that many speakers at meetings of the AAAS's Program were associated with the Foundation. Reluctantly, the physics section at the AAAS have concluded there is something of a conflict of interest here and that the John Templeton Foundation is putting a bit too much of its mouth where its money is.

*Ralph Estling writes from Ilminster, Somerset, England.*

**During the last four years the John Templeton Foundation has given over $1 million to the American Association for the Advancement of Science's Program of Dialogue on Science, Ethics, and Religion.**

The idea that individuals and organizations that donate large sums of money to some worthy cause might thereafter feel somewhat inclined to seek to influence that cause will come as a great shock to those of us who have spent all our lives locked in an attic. If I were not as shy and diffident as I am and loath to offer unsolicited advice, I would advise the American Association for the Advancement of Science to get the hell out from under the John Templeton Foundation—publishers of *Progress in Theology* magazine and promoters of something called the "Freedom Project," which is "a study of the benefits of private enterprise"—and do so immediately and entirely.

Perhaps the conflicts of interest between God and Mammon can be reconciled, though I have my doubts. But reconciling the methods, aims, outlooks, and achievements of science and religion cannot. Quite a few people will not agree with this dogmatic approach of mine, including quite a number of scientists. AAAS president Stephen Jay Gould wrote, in an immemorable phrase, that science and religion occupy "non-overlapping magisteria," i.e., they busy themselves with different things and therefore are not in conflict with each other. Of course they are in conflict, dire, direct, and total, because both seek to explain underlying reality. Both cannot be true. Or even relevant. I've dwelt on this notion on a few occasions and don't intend to repeat it all over again. So let me veer off to the side a bit.

Over the years many people have pointed out that belief in a personal God who designed and created the universe is less irrational and unreasonable than some of the hypotheses being put forward by some physicists. They are right.

Some ideas about physical reality presented by scientists over the past seventy years or so, from various quantum theories to the latest musings about an infinite number of universes inhabiting infinite spatial dimensions, are more mystical and bereft of supporting evidence than anything to be found in religion, demanding more substantial suspensions of disbelief than any poet or priest ever asked of us. The authors write like people afflicted with Wernicke's aphasia, creating perfectly grammatical sentences which convey no meaning whatever.

What can we say to this, besides, that is, that it is quite true. We can say this. One form of irrationality does not excuse another. Believing in a personal God makes life very comfortable and cozy. The believer has no problems, no questions, no troubling doubts and tormenting confusions. And so he is the spiritual equivalent of a cow contentedly chewing her cud in her grassy field, content with the divinely destined nature of all things clearly meant for her benefit, the gift of a beneficent Being, unaware that a short distance away, out of sight from the meadow, the butcher is carefully grinding his ax.

**I would advise the American Association for the Advancement of Science to get the hell out from under the John Templeton Foundation—publishers of *Progress in Theology* magazine.**

So perhaps in the long run (and we have had a nice little trot, haven't we), our problem lies not only with the likes of the John Templeton Foundation but also with members of the physics section of the American Association for the Advancement of Science and all other physics sections who deride religion but ape it in all its mystical attributes, in the name of Science. Is it not a case of Physicist, cure thyself? I think it is.

I do not admire the John Templeton Foundation because I do not admire people who, though they can, refuse to think. I do not like intellectual dishonesty and the cant that goes with it. And similarly, I do not admire those physicists—the ones Martin Gardner calls the Mysterians—for their betrayal of all that science stands for, even if they receive a million dollars.

I guess this means I've just thrown away my chances of winning next year's John Templeton Foundation's prize. A shame. I could have used the money. □

## *DID A CLOSE ENCOUNTER OF THE THIRD KIND OCCUR ON A JAPANESE BEACH IN 1803?* *from page 41*

*Shousetu*, "Hara-yadori" written by only *kana* can be found. Two Chinese characters of "Haratono" can be also read as "Hara-yadori" by *kana*. Therefore, these two place names can be considered to represent a same name.

3. For example, two British whaling ships arrived at "Ohtsu-hama" in Hitachi state in 1824. This incident can be found in the official document of Tokugawa shogunate (Hayakawa 1902). Of course, "Ohtsu-hama" is a real place name and can be easily found in the many records. Furthermore, several items of folklore of *Utsuro-fune* have been handed down in Hitachi-state (Yanagida 1962), and this state was near Edo. So, it was a most plausible place to everyone in Edo.

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## Risky Business: Vividness and Media Paradox

Thanks for the stimulating article by John Ruscio on risk and risk perception (March/April 2000). I agree with his statement of the Media Paradox, but I'd like to suggest an even stronger conclusion: namely that the hazards featured in media reports almost always represent low risks. The reason is that common risks are not very newsworthy. Thus we read about airplane accidents and shark attacks and food poisoning and hostage-taking precisely because they are rare.

In comparison, most cases of auto accidents, heart attacks, homicides by family members, prostate cancer, etc., are not reported at all or are limited to the newspaper obituary page. Thus in Ruscio's example of the fast-food franchise in Boston, he concludes that the specific restaurant that had been closed for a health violation would be an especially safe place to eat after it reopened. I suggest that the lesson is that fast food restaurants are in general safe, based on the large publicity that accompanies rare cases of food poisoning. Such stories would not be front-page news if many customers got sick from eating their food.

I am curious why Ruscio calls the Three Mile Island (TMI) accident in 1979 "tragic." My dictionary defines "tragic" in terms of widespread death and destruction. Unless I have been misinformed there were no deaths and little destruction caused by the TMI accident. From the widespread media coverage of this accident, I am inclined to conclude that US nuclear plants are in general quite safe to live near, not just TMI in particular.

David Morrison
Saratoga, California

John Ruscio did not mention some other distortions in risk perception that exist among people, some actually justifiable. In comparing numbers of deaths between, say, diabetes and homicide, no distinction is made between grossly premature deaths (homicide) and causes (diabetes) that result in moderately premature deaths but only in unusual cases take lives of the very young. Thus we, both individually and as a society, may be very rational in worrying more about homicide than diabetes. If we normalize by "years lost" rather than just death count, homicide may even come out ahead in the equation.

Another factor that enters into risk perception is the question of what can be done about a particular risk. Risks that are perceived as inevitable (contracting diabetes, for example) raise little attention. Risks that people have some individual control over (auto accidents, for example) receive more attention, and are generally well perceived but often ignored. The most disproportionate perception of risks are those over which individuals have no control, but society as a whole, i.e., governments, do: nuclear accidents, acts of terrorism, environmental pollution, etc. In these cases, the public, often fueled by excessive media attention, may demand utterly unreasonable government responses to perceived risks that are in fact inconsequential. Consider, for example, airline security checks. Each time you board a plane you pay a tax of about $5 to "insure" yourself against a risk of less than one in a million of suffering an act of terrorism. I'm sure more lives would be saved by spending that money on automobile safety measures or free screening for diabetes, but individuals would prefer to reserve those measures for their own personal choice, while at the same time making unreasonable demands on government for security in matters beyond individual control.

Finally, there is a matter of frequency of occurrence that alters public perception. Events that happen every day (such as auto accidents) tend to be accepted or at least perceived more or less correctly in terms of importance. Rare events, such as earthquakes, tend to be over-perceived risks. However, events that occur less often than once in a lifetime tend to drop from sight. Volcanic eruptions are on the threshold of that—all the folks living in the shadow of Vesuvius near Naples tend to ignore the risk because major eruptions occur less than once in a lifetime. An even less frequent, but statistically well understood, risk is that from asteroid impacts. As counterintuitive as it may seem, that risk is comparable to the risk of flying in commercial aircraft, but because a major impact has not occurred in recorded history we almost completely overlook it and ignore the risk.

Alan Harris
La Cañada, California

I read with great interest your recent article "Risky Business." One of the reasons why stories told in vivid detail are so much more memorable is just because human brains are attuned to remembering stories.

Software publishers who rewrite their user manuals using concrete examples often find that user comprehension increases.

For example, Pat, a technical writer I know, was assigned the task of overhauling the company's manuals. The guides would often avoid talking about a user, and would offer illustrations using bland, improbable names like FileA, FileB, and FileC. Instead, Pat created a fictitious user named Sandy, who had cookie recipes in files ChocolateChip.cke., Oatmeal.cke, and PeanutButter.cke. All of a sudden, users stopped falling asleep while reading the manuals.

As a second example, compare the previous two paragraphs in this letter. The first one presented a dry fact, using abstractions. Although it was general, compact, and highly defensible on logical grounds, it lacked life and was easily forgotten. In the second paragraph, the same idea is brought to life when there's a protagonist to the story, who acts heroically to achieve a happy ending. The story is a lie; Pat is as fictitious as Sandy and both were chosen to be gender-neutral, but the story made more sense than the cut-and-dried facts.

Allan Bonadio
Sunnyvale, California

The only "paradox" of this "Media Paradox" article is that an otherwise respected publication would not only publish it, but trumpet it as though it says something.

. . . That a story has more staying power and greater credibility if it's told vividly, specifically from a personal angle, is a concept known to storytellers since before recorded history. Many scholars note that the great myths of old, and even much of what ancient historians have written, are less about recording actual events than about transmitting desired beliefs, morals, etc. These stories are told with human and/or animal characters, not simply as a list of precepts, but because that's what people remember best. Duh.

The passages about how news organizations "rigorously screen [potential stories] for their ability to captivate an audience" would be laughable if they weren't intended to be taken seriously. Perhaps the writer should have tried some research like, say, looking at a Journalism 101 textbook or visiting a real newsroom. Defining what's "news" depends very much on the news outlet. The basic mission to "educate, enlighten, and entertain" the audience is very much tempered by

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**JANUARY/FEBRUARY 1996** (vol. 20, no. 1) How to make an alien for autopsy, *Stokes* / EMDR treatment, *Lilienfeld* / Psychic crime detectives, *Wiseman, West, and Stemman* / Health statistics bad for our health, *Paulos* / Science and reason in film and television, *Evans* / Post-Freudian dream theory, *Gardner.*

**NOVEMBER/DECEMBER 1995** (vol. 19, no. 6) The GAO report on Roswell, *Klass* / Why creationists don't go to psychic fairs, *Taylor, Eve, and Harrold* / Eyewitness testimony and the paranormal, *Wiseman, Smith, and Wiseman* / Objectivity and repeatability in science, *Mussachia* / Culture-bound syndromes as fakery, *Bartholomew* / Freud's theory of dreams, *Gardner.*

**SEPTEMBER/OCTOBER 1995** (vol. 19, no. 5) The paradox of knowledge, *Loevinger* / Consciousness as a valid subject for science, *Ingalls* / School daze: review of African-American baseline essays, *Rowe* / Mystical medical alternativism, *Raso* / China, chi, and chicanery, *Huston* / Fuzzy logic, *Gardner.*

**JULY/AUGUST 1995** (vol. 19, no. 4) How to sell a pseudoscience, *Pratkanis* / Rumors, self-fulfilling prophecies, and national obsessions, *Paulos* / Rose Mackenberg, *Pankratz* / Moon, planets, and disasters, *Branham* / Artificial languages, *Gardner* / *The Roswell incident* and Project Mogul, *Thomas.*

**MAY/JUNE 1995** (vol. 19, no. 3) The belief engine, *Alcock* / Is skepticism tenable? *Beloff plus Blackmore, Hyman, Kurtz, Alcock, and Gardner* / Mediumship, *Stein* / Ancient aluminum, *Eggert* / Crop circle mania wanes, *Nickell* / Doug Henning and TM, *Gardner* / A young Grand Canyon? *Heaton.*

**MARCH/APRIL 1995** (vol. 19, no. 2) Remembering dangerously, *Loftus* / Antiscience in academia, *Gross and Levitt* / Feminism now alienating women from science, *Koertge* / 'Lights out': A faxlore phenomenon, *Brunvand* / Critique of evolution study, *Larhammar.*

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the limited space or airtime and resources, shaped by the desire to mix news, features, and service stories, and finally formed by the coverage area of the particular news outlet. The local prom queen would make the front page of the *Hometown Gazette* and fly entirely under the radar of the *New York Times*. "Unusual" is just one part of defining what's a news item.

Much of the story was simply confusing. The "newsworthy" death coverage (page 24) had me stumped. Was he saying that the newspapers surveyed did not carry obituaries and/or death notices that listed the cause of death (one of the few constants expected in local newspapers), or that he expects to see headlines like "Cardiac Disease Claims 1,298th Victim"? I don't know where he gets the idea that the media are in the business of being some sort of warning system, but a headline like that would scare the bejeebers out of most people. While there are obvious exceptions, most readers expect that what's singled out as "news" is, by definition, out of the ordinary. . . .

Thus the writer's "advice" on media falls flat. There are ways to distinguish the "french fries" from the nutritional vegetables of news: How many sides of the issue are presented? How many sources are quoted, and are those sources sufficiently knowledgeable to be worthwhile? Like defining news, judging news delivery is a bit complicated. But it can be done, though not with any help from something like "The Media Paradox."

Michelle Pilecki
Managing Editor
*Pittsburgh* magazine
Pittsburgh, Pennsylvania

John Ruscio's article "Risky Business" was indeed a perceptive appraisal of fatality-risk assessment as compromised by informational and emotional reactions by those subject to media-reporting biases. However, statistical information alone cannot remedy such biases, since often figures and statistics are rendered with the intention of altering public perceptions with misleading data. Coupling this with a basically trusting and frequently gullible public produces a culture beset with urban legends. But one should not dismiss several indispensible elements to realistic appraisal of risk-assessment unmentioned in the article: prudence, judgment, and wisdom. *Id est*, ordinary horse-sense.

Consider the jogger who daily huffs and puffs down the boulevards and sidestreets of the typical urban center, hyperventilating copious amounts of carbon monoxide and traffic-stirred molecules of shoe leather, rubber tire dust, pulverized pigeon droppings, etc. Which is more likely to induce respiratory illness in said nonsmoker, his daily run or the secondhand smoke from the cigar-chewer at the far end of the bar? Who is more likely to bite the dust, the otherwise-health-oriented skydiver or surfer, or the thrill-timid chainsmoker whose evening diet is a quart of rum and Coke? One must suspect the intention of propaganda disseminated by health charities in the former case and by the alarmist, competitive news media in the latter. They're doing their job, which is basically to attract attention. Possible contributing factors are marginal to the message they wish to convey.

The bases for statistics must likewise be questioned. If for no other reason than I remember being a youngster, I have long remained skeptical of surveys involving adolescents—or students of any age—especially regarding subjects like sexual activity, alcohol consumption, or illegal drug use. Squares will mislead by boasting or even lying, while overindulgers tend to exaggerate rare instances of moderation. Some kids just have a mischievous sense of humor, and will claim anything for effect. Never mind that we're seldom—if ever—informed of whether or not rendered statistics were peer-reviewed, instructor-reviewed, or reviewed at all. The same rule applies, in many cases, to fatality-risk statistics, especially when stigma-related diseases such as AIDS are reported as pneumonia, et al., in public death records. . . .

Thomas L. Munden
Hawi, Hawaii

Your "Risky Business" article contains a big error in asserting that more people die each year of stomach cancer than car accidents.

The American Cancer Society's "Cancer Facts and Figures 2000" projects 13,000 fatal stomach cancer cases this year (7,600 male, plus 5,400 female). I just looked at the latest National Highway Traffic Safety Administration report I could find on the Web, covering 1998. It showed 41,471 US traffic deaths that year. I believe the annual death toll has been dropping, but certainly not below 13,000 by this year.

I suspect the source of the error is that instead of "stomach cancer," what was really meant was stomach cancer and/or colon and rectum cancer. The ACS publication projects colon and rectum cancer deaths in 2000 at 56,300 (27,800 male and 28,500 female). That alone, even without stomach cancer, would almost certainly exceed annual U.S. traffic deaths.

Lee Siegel
Science Editor
*Salt Lake Tribune*
Salt Lake City, Utah

*John Ruscio responds:*

*I am pleased to see that my article on the "Media Paradox" sparked so much interest. I am grateful for the many opinions and anecdotes that readers have shared with me, many of which appear here in the Letters column. In particular, I would like to thank Lee Siegel, science editor for the* Salt Lake Tribune, *for pointing out a factual error and Scott Plous, author of the book that I cited for my answer, for uncovering its source. The error: I indicated that the death rate in the US from stomach cancer exceeds that of car accidents, and it turns out that this is not true. In the fine print of the study that he in turn cites, the authors note that their statistics are based on local, not national, data. Neither Plous nor I realized that this comparison involved a local anomaly, and I apologize to readers for passing along the incorrect statement. The vividness effect and the availability bias are nonetheless robust phenomena in our judgments of frequency and probability, as the remaining (and factually correct) comparisons illustrate: More people die in the US each year from falling airplane parts than from shark attacks, from lightning than tornadoes, and from diabetes than from homicide. Though there is nothing inherently wrong with reporting infrequent events, as consumers of this information we must recognize their rarity and form our beliefs accordingly.*

## Critiquing Prayer Studies

Tessman and Tessman ("Efficacy of Prayer," March/April 2000) offer a telling exposure, in some detail, of claims regarding the therapeutic efficacy of prayer. I suggest that a more general criticism can be made that is quite independent of the validity or otherwise of any comparative trial that might be undertaken.

A drug or surgical procedure cannot know that it is being tested; a god, of the sort envisaged in received theology, would certainly know that He is being tested—and may or may not skew the results as He pleases. The comparisons attempted by both Byrd and Harris therefore rest upon inbuilt departure from basic requirement to com-

pare like only with like (in every respect excepting the variable being investigated). Ipso facto, any deliberate testing of the efficacy of prayer is invalid.

Eric Stockton
West Cott, Sanday,
Orkney, U.K.

Recent discussions on the supposed efficacy of intercessory medical prayer seem to me to fail to take into account an unavoidable consequence of American beliefs, namely, that it's impossible to establish a control group of patients that are not being prayed for. We've all seen the surveys of Americans and their religious beliefs and how we seem to be among the most believing people in the world when it comes to the question of a personal God. So how can anyone establish a control group that they can be sure isn't being prayed for by their loved ones? Can we seriously expect, given our beliefs, that a friend or relative in the hospital isn't receiving consideration of prayer from someone? This seems highly unlikely to me.

This being the case, there is a very real paradox here in that we can now expect the outcomes of the two groups (prayer group and control group) to be the same *whether or not there is any efficacy of prayer!* If prayer has no efficacy at all, neither group has any advantage over the other. But if prayer does indeed provide medical benefits, then the two groups would realistically be in the same boat and would be receiving the same benefits. Either way we can expect both groups to fare the same.

But they don't. Why not? Because there's something else going on that isn't realized in any of the studies conducted. And this is where Tessmans' article makes its mark. Improper design and fallacious analysis explain quite well the positive conclusions that the studies in question claim to provide. Further, the fact that these improprieties always seem to result in positive conclusions (and knowing that negative results are rarely published) might well indicate bias and expectation on the part of those conducting such studies.

Ray Sutera
Ocean Grove, New Jersey

Humphrey (Follow-Up, "The Power of Prayer," May/June 2000) remarks on the outright miraculous retroactive effect of prayer in the study of Harris et al. (critiqued by the SI Tessman and Tessman article). Such skewedness in the early dropouts has a chance of about a half percent of occurring "naturally" (both by a chi square test and Fisher's exact test). Like Humphrey, I asked Harris about it and received a vague answer.

Harris et al. state in their paper that the analysis was done by "intention-to-treat." This means that all randomized patients are analyzed, including the ones that drop out of the study for whatever reason. Such an approach reduces an error of many so-called blinded studies, namely that unfavorable cases are preferentially thrown out of the "treatment group." What Harris did can't be called "intention-to-treat."

Maybe some of these patients had died by the time their names were collected for prayer. The names of newly admitted patients were transmitted as soon as possible to the prayer teams. It would have required clairvoyance to prevent passing on the names of the early dropouts, so some names were only removed when all data were analyzed. From the paper one can't tell what happened exactly. It's interesting that Harris never bothered to figure out what happened, if only to clear away nasty suspicions that mere shoddy research has made God seem to be a prayer-operated machine.

Jan Willem Nienhuys
Waalre, Netherlands

The fascinating article by the Tessmans on "Efficacy of Prayer" (for medical patients) states that informed consent was waived because the study posed no known risk to patients. For those of us who are not superstitious this may be true, but they were praying to a far-from-benign deity.

In the long period of human history before modern medicine, He/She/It showed no enthusiasm to relieve human suffering by removing disease—which should have been within the capacity of any omnipotent being.

The documentary evidence is also damning. This is the deity that allowed suffering to be inflicted on his faithful servant Job simply to win a wager with the devil (Job 1&2). This is the god that puts humans "under a delusion" so they will believe a lie and so can be punished for eternity (2 Thessalonians 2:10–12).

Incarnated on Earth as "the Son" he spoke to the crowds in parables so he would not be understood. "Otherwise, their eyes might see, their ears hear, and their minds understand, and then they might turn again, and I would heal them" (Matt.13:10–15).

With this evidence surely any experimenter should seek consent from patients before risking prayer. Or was the experimenter a closet unbeliever?

Jim Ring
Nelson, New Zealand

## Staring Studies

The article "Can We Tell When Someone is Staring at Us?"... was very interesting. I remember when I was single and I had passed by a very attractive woman. In my mind, I had wrongful thoughts. The woman *looked at me and said, "You're disgusting!"* For awhile I thought that somehow this woman read my mind, but as time went by, I came to the conclusion that she simply read my facial expressions and eye movements.

Paul Dale Roberts
Elk Grove, California

As a regular reader of SKEPTICAL INQUIRER, I've noted the almost universal requirement of "control groups" suggested by experimenters in parapsychology. It was therefore surprising that Robert A. Baker ("Can We Tell When Someone Is Staring At Us?" March/April 2000) proposed and demonstrated two tests for the staring phenomenon without resort to such controls.

In his first (a field test) experiment, a control group of similar subjects (also forty in number) is required which would not be stared at but would only be asked to answer the same questionnaire as the test group. It's possible that the results would turn out to be identical to the "stared at" group, thereby negating any results.

The second (a controlled laboratory experiment) test desperately calls out for the repeat of the test with a control group and the following change: The participants would be misinformed that they will be stared at five times. In fact there would be no staring, and again, it's possible that the control group may report results similar to the only group Baker tested.

This investigation of "staring" would seem to be flawed without the addition of *the time-honored practice of controls.*

By the way, in the latter test Baker refers to the subjects "guessing" at the times they were being stared at. That's certainly not a neutral comment for an observer. Weren't the subjects simply "reporting" their times?

George Dunbar
Toronto, Ontario

*Robert Baker replies:*

*Asking forty more individuals whether they were aware someone had been staring at them for the last 5 to 10 minutes—when no one was—would in no way cast any additional light on the experimental question. If they all said* no *this would merely confirm they were honest. If they all said* yes *it would tell us they were either liars or they were paranoid. In neither case would it help us answer the question asked: Can people tell if someone is staring at them?*

*For the students being asked, again telling fifty students they were being stared at five times during the twenty-minute period when they were not stared at on any of the twenty one-minute trials gives us no information bearing upon the experimental question asked. This, simply, is why "control groups" in these two demonstrations are and were irrelevant and unnecessary.*

## Reverse Speech

I very much enjoyed "The Demon-Haunted Sentence" (March/April 2000), the report by Tom Byrne and Matthew Normand about David Oates and his "Reverse Speech" theories. The article was very interesting and informative. However, I was disappointed that the authors did not address an obvious question that springs to mind: Is there any connection between Reverse Speech and so-called backward masking, or backmasking?

Backmasking allegations, which were widespread during the 1980s, claim that rock music contains hidden messages (usually satanist, of course!) if played backward. These backmasked messages are supposedly perceived by the unconscious mind, conveying a "subliminal" message to the listener. Many people still believe this claim, which now has the status of an urban legend.

Do the authors know whether Oates's theories were inspired by those earlier backmasking claims, or if there is any connection between the two ideas? If so, a brief postscript to their article might be of interest.

Melanie Nickel
San Diego, California

## Mad Messiahs

A comment on Martin Gardner's (very good) article "Mad Messiahs."

It is surprising that Mr. Gardner did not mention Shabbetai Zevi's important catalyst—Nathan ha'Azati, or Nathan from Gaza. Playing a latter-day John the Baptist to Zevi's Messiah, he was instrumental in the success and spread of the movement. Proselytizing and proclaiming Zevi to be the chosen Messiah, it was mostly his effort and "public relations" that made Zevi famous (as the great Kaballah scholar Gershom Scholem says in his book about Zevi). It would be interesting to investigate how important such partnerships are in the history of mystical mass movements. It seems that a vigorous, down-to-earth second in command would be necessity for a mystic to gain any real influence.

Avital Pilpel
[No city]

Re: Mad Messiahs. Excellent article. I grew up in a Jewish home and attended Hebrew School. We had been taught that there were many false messiahs (including Jesus) down the ages. But they never gave us the juicy details. Thank you Mr. Gardner for a fun and enlightening bit of reading, as always.

Brad Marshall
New York City

Just a brief note about Martin Gardner's unfailingly interesting column about mad messiahs. Gardner writes: "I assume that the hyphen in 'God' ["G-d," in a quoted Hasidic text] was intended to reflect the absence of vowels in Hebrew writing." Rather it's a standard, oblique reference to the Tetragrammaton, the four Hebrew letters standing for the ineffable, forbidden-to-be-uttered name of God, usually transliterated from the Hebrew as YHWH (Yahweh or Jehovah).

Morty Schiff
College of Staten Island
Staten Island, New York

Martin Gardner's review of messianic beliefs made an incorrect assumption about the missing vowel in the word "G-d."

Orthodox Jews have interpreted the Second Commandment's prohibition on using the deity's name in vain as a restriction against *any* use of that name other than during actual prayer or liturgy. Outside of liturgy, changing the word by inserting a hyphen in place of the vowel is considered compliant with the commandment. Similarly, when using Hebrew, the word for God, "Adonai," is replaced by the otherwise meaningless word *adoshem*. I still remember having to use the substitute word when practicing for my Bar Mitzvah, and have often noted its use in motion pictures or stage plays when depictions of Jewish prayers are part of the dialogue.

Thanks to Gardner for an otherwise excellent article.

Les Goulden
Los Altos, California

## Oak Island's Secrets

I read with great interest Joe Nickell's recent report concerning "The Secrets of Oak Island" (March/April 2000), typical of his cogent and informative reporting. His central thesis appears to be that the so-called "Money Pit" results from a combination of a naturally formed sinkhole whose character and content have been misinterpreted through association with Masonic influences. He goes on to detail these specific associations, especially pointing to the Masonic background of many explorers who have sought to solve the putative mystery.

While there is worthy explanatory value in this connection, I found it flawed in a way that I would appreciate Nickell's further commentary on. He is at pains to point out the power of symbolism and allegory in the "secret vault" notion, a notion which he emphasizes was highly familiar to many of the actual explorers. The logical question being, If such individuals we so aware of this, why did they spend such a large amount of time and resources exploring what they, especially, should have known was a myth? While we might attribute such a pursuit to sheer human folly or even a willful self-ignorance, if Nickell's proposal is to represent the final solution, it must surely provide some further indication of the motivation which moved these individuals to action.

P.A. Hancock
Professor and Director
Human Factors Research Laboratory
University of Minnesota

I thoroughly enjoyed Mr. Nickell's article on Oak Island and I hope you will do more of this kind of story. I was not aware of the Masonic connection, although I am still not sure what the purposes of it is. Is it intended to be an allegory of Masonic existence, an initiation ritual, etc.?

Leaving aside the Masonic connection, I must say the Oak Island story always seemed to me to be odd. It assumes a crew of pirates decided to bury treasure. They dug a pit at least twenty-five feet deep and presumably placed a chest at the bottom. They then either constructed a cunning booby trap or happened upon a natural cave which would fill up the tunnel from the sea with water. Presumably, they had a gate which they could use to close off the water so that they could retrieve the treasure when they came back. Let's take a look at what that requires.

Neither seventeenth nor eighteenth century pirates would have anything more than shovels, picks, and buckets with which to excavate a pit and dig a tunnel to the ocean. Twenty-five feet or more is a considerable dig. Then there is the making of a tunnel to the sea or the adapting of a natural cave. All in all, this was not a brief venture. The ship would have had to anchor for weeks. To be sure, this area was sparsely populated then and there were surely many fewer ships that might happen by. Nevertheless, pirates were a group against whom every man's hand was turned. How likely was it that a group of pirates would have lingered so long never knowing when a Royal Navy squadron might appear?

Clearly, it would take a while to recover the treasure. Again, would a pirate want to hang around waiting for the navy to show up? Thus, I suspect any pirate would hide treasure where he could get it quickly. . . .

I also note the fact that the treasure always seems to move away as one reaches for it, always keeping just out of one's grasp. This is an old story. From Greek myths on to today we have had similar motifs in our culture. Sometimes it is a real event, as when Coronado kept looking for the city of gold (or, often, seven cities of gold) or the pursuit of the Fountain of Youth. The story itself seems to have a moral to it, which makes it suspect to me if taken as anything but a fable. . . . I look forward to Nickell's next article.

Phil Trice
Oak Park, Illinois

*Joe Nickell responds:*

*I am grateful to Mr. Trice and Prof. Hancock, as well as others who wrote to me personally, for their favorable responses to "The Secrets of Oak Island." As I'm sure everyone appreciated, this was an unusual case that invited an unusual solution.*

*As to why individuals would expend considerable effort in searching for a treasure that they knew to be fictitious, I would not ask the question that way. I believe the Freemasons were engaging in what I understand are termed "open-air rituals" relating to a quest for the allegorical Secret Vault. Initiates appear to have spent time on the island engaging in various Masonic activities, including producing numerous stone works and acting out their particular dramas. For example, the rites of the Master Mason degree feature a quest after certain vague secrets—specifically "that which is lost"—which, in the end, remain lost. A.E. Waite (*A New Encyclopedia of Freemasonry, *1970) observes that Masonic rituals invariably represent "a Mystery of Quest" (vol. II, p. 311).*

*It is important to note that Masonry incorporates symbolism of the stonemason's trade and that, as one text explains: "We significantly speak of the place of initiation as 'the secret vault, where reign silence, secrecy and darkness.'" As well, "Like every other myth and allegory of Masonry, the historical relation may be true or it may be false; it may be founded on fact or the invention of imagination; the lesson is still there, and the symbolism teaches it exclusive of the history."(See my* Secrets of the Supernatural, *Prometheus Books, 1988, chapter 10.)*

*I believe the Oak Island treasure tale provided an ideal means of illustrating the quest for the Secret Vault while, at the same time, providing a cover story that concealed the true meaning from others.*

## Constructivism Misconstrued?

While I agree with some of the points George Englebretsen makes in his critique of current abuses of "constructivism" and related terms and ideas (March/April), he is, if I am reading him correctly, badly in error in his comments about constructivism in mathematics education.

He quotes a hypothetical educational theorist as stating, "The teacher must give the students the tools required for them to construct the concept of number. . . ." He fails, however, to make clear what his objection is to this notion, though he erroneously states that constructivists "say such things without being prepared to say just what constructivism is, let alone offering arguments to support it."

The number of works that develop constructivist theory and how this theory can be implemented in mathematics education is vast, so large in fact that I have to believe that Mr. Englebretsen simply has failed to take the time to do a moment's research into the matter. Were he to do so, he might realize that the claim made in what is known as radical constructivism (developed most fully by von Glasersfeld) is that all knowledge is constructed by the individual. This seemingly shocking contention, which is grounded in the work of Piaget, simply asserts that each individual has to undergo some experience in order to acquire specific knowledge of the world and that prior experience (i.e., who that person is at that point in her life) has an effect on how she processes the experience and constructs new knowledge.

One extension of this claim, among many, is that people are more likely to learn something in mathematics if they have experiences that open them to constructing an insightful understanding of the underlying mathematical concept, as opposed to being handed a fact, theorem, or algorithm and told: Know this, believe this, do this; it's true, it works. Traditional mathematics pedagogy, which successfully serves an unsatisfactorily small subset of all students, has stressed lecture, memorization, and drill over experiment, questioning, and indeed most of the things that skeptics value highly.

The constructivist movement in mathematics education, which is not unrelated to, while distinct from, constructivism in the philosophy of mathematics (see the work of Paul Ernest), is far more in keeping with the notions of seeking after truth for oneself rather than blindly accepting received wisdom that comprises much traditional mathematics teaching. It is not, however, license for people to believe any nonsense that suits them.

The danger in lumping this kind of constructivism in with that which informs much "New Age" thinking . . . is that radical constructivism in mathematics education promotes skeptical thinking and much of what it opposes supports conformity and acceptance of the status quo, precisely the opposite of what leads to new ideas and discoveries in mathematics and science. Throwing out babies with bath water is rarely wise.

Michael Paul Goldenberg
Ypsilanti, Michigan

In response to George Englebretsen's attack on the "pseudointellectual," "postmodern nitwits" who promote "New Age constructivism," I would like to clarify some points regarding its application in modern educational contexts. He mocks the idea that

"The teacher must give the students the tools required for them to construct the concept of number (or nation, or species) for themselves," but it is not necessary to make the prima facie leap to radical relativism that Englebretsen suggests is implied in this statement.

That students construct their own meaning in no way need suggest that *any* meaning is fine. It refers to the pedagogical imperative to start with what makes sense to children in light of other information that they have acquired at given points in their lives. These understandings must serve as the bases for deciding how best to address their misconceptions. Use of the term "misconception" in itself implies a belief in objective reality.

Admittedly, some constructivist literature prefers the term "alternative conceptions," which does seem to endorse relativism. Although misleading, the intent of this term is to usually to reinforce the need to honor children's ideas, not to accept them. All beliefs *are* of equal value, but only because they must be honored as *starting* points, not because they are accepted as end points. Scientists honor foundational ideas (both their own former ideas and historical developments), and this is also critical in education.

To ask students to believe information simply because it is currently accepted by scientists is to ask them to accept on blind faith and does not take into account the way they make *sense* of the world. Rational belief is a foundational principle in the programs that I have been working to develop over the past several years: *Why* do we believe what we believe? Books like Carl Sagan's *The Demon-Haunted World* and Martin Gardner's *Fads and Fallacies in the Name of Science* have played important roles in the development of my teaching philosophy.

Far from viewing science as "single-mindedly monolithic and able to repress all possible alternatives," this method of teaching science allows students to gain firsthand experience of the intense controversy that characterizes scientific pursuit, thereby giving them far greater insight into the very nature of scientific knowledge. To say that the constructivist is "happily free" of the restrictions that bind traditional science is misleading. Students are encouraged to articulate and develop their own theories, but these theories are then subjected to what is often very critical peer analysis. This often occurs during a discourse session that is much like a scientific conference. The teacher provides further arguments to help students transcend ways of thinking that are inconsistent with known evidence.

Contrary to Englebretsen's closing comments, I do hope to be taken seriously because of the force of my arguments, which are outlined in greater detail in the documents available on my Web site (www.telusplanet.net/public/martina/elemsci.html). I believe that the underlying principles of what I am trying to do are very much in line with those of CSICOP, and critical feedback would be of tremendous value to the ongoing development of a program that I believe serves all of our interests.

M. Schmidt
Science Alberta Charter School
Calgary, Alberta, Canada

## Star of Bethlehem Redux

It is obvious that Phillips Stevens, Jr. (Follow-Up column, March/April 2000) did not read my book, *The Star of Bethlehem: The Legacy of the Magi* (Rutgers). Nevertheless, he labeled it as another modernistic interpretation and dismissed it as "irrelevant."

A major theme of my book is exactly contrary to Stevens's erroneous indictment: Previous theories about the Star of Bethlehem have applied anachronistic ideas, mixed different cultural practices and mythologies, and added personal religious beliefs while failing to consult the actual historical record. The book attempts to correct those mistakes, some of which Stevens repeats.

For example, "in the east" (Greek: *en te anatole*) did not signify the rising of the Sun, as Stevens claims. The phrase was not a mythological allusion about the East and Mithras. It was an Hellenistic astrological term for the time a planet emerged from the "arc of combustion" of the Sun. The primary sources tell us that when the "star of Zeus" (Jupiter) reached twelve degrees from the Sun, the planet had super powers to confer kingships. And for that important reason "in the east" is mentioned twice in Matthew.

My book explains that the Messianic star was an astrological portent on 17 April 6 B.C. when Jupiter was "in the east" and accompanied by several extremely significant astrological conditions that centered around Aries the Ram. All of this pointed to the birth of a great king in Herod's realm. Although these conditions were stupendous according to ancient beliefs, they are unimpressive for modern mindsets that expect visually spectacular celestial fireworks announcing Jesus' birth.

I make no claim that Jesus was born under this regal star because his birth date is unknown and controversial. But early Christians did believe he was born under a Messianic star. And I argue in the book that this astrological portent was the basis for the Biblical star. Corroborating my work is a reference from a Christian Roman astrologer who write that conditions like those of 17 April 6 B.C. were the basis for a "divine and immortal" birth. I believe that this is an independent reference to the Star of Bethlehem.

Michael R. Molnar
Warren, New Jersey

*Phillips Stevens, Jr. responds:*

*My "Follow-Up" was drafted in November 1999, before I read a* New York Times *article about Molnar's book. Because of my interest in magic, I ordered it immediately, and I read it avidly. It is extremely well-researched, well-reasoned, and well-written; I called it "intriguing"—in fact, it is utterly fascinating. I do apologize for "irrelevant." That was too strong; I should have said "insufficient." But the purpose of my article was not to discuss Molnar's thesis, and the space available to me was severely restricted, as it is here.*

*Molnar's book addresses most of the themes I would consider "relevant" to speculating on the origin of the Star of Bethlehem motif, and it does so far more carefully than most other researchers. I am not qualified to comment on his detailed astrological reconstructions. Astrology, however, is a human cultural construction; its symbolism in "east" and by derivation, "rising," surely originates in the universal human meaning assigned to the passage of the Sun.*

*But after all his careful historical research, Molnar's main thesis rests on some weakly supported assumptions. The Gospels were compiled from disparate Jewish oral traditions, some decades after the events they describe; and despite the Jews' curiosity about astrology and the other divinely proscribed forms of magic, and despite any "stupendous" astrological event that might have been discerned by any "magi," it is unjustified to speculate on* "what an astrologer might have said to the evangelist" *(p. 95, my emphasis).*

*Molnar wants the "magi" of Matthew's text to mean any contemporary, Hellenized astrologers, whose excitement over their discovery influenced both Herod and Matthew (but no other gospeler). He acknowledges (p. 32ff.) the Persian referents*

*for the Greek* magos (magoi, *pl.*). *He traces the magoi's reputation astrologers back to Darius, but he ought to have gone back just one more generation, to Cyrus. We cannot understate the impact of Cyrus, his culture, and his religion, on the Jews following the liberation of them from culture, and his religion, on the Jews following his liberation of them from Babylon. He is specifically identified as Messiah in two post-exilic scriptures. Zoroastrianism and Persian culture, and the fascination with Cyrus' own "magi," were fundamental in the development of subsequent Jewish cosmology. I fall back on my statement, "The major reason for Matthew's star was in his wish to have representatives of Cyrus, the greatest king in history, come and kneel before the new King."*

## Field Guide or Flawed Guide?

We are not surprised that your reviewer, managing editor Benjamin Radford, did not like our book, *The Field Guide to Bigfoot, Yeti, and Other Mystery Primates Worldwide* (January/February 2000). What disappointed us is that he passed up an opportunity to compose an intelligent reply to our thesis, the mainstream version of which appeared as a *Scientific American* cover story, "We Were Not Alone" (January 2000). Instead he chose to nit-pick and poke fun at our book, making numerous errors and embarrassing gaffs in the process.

Radford states that "because a creature has a name does not imply that it actually exists." We never claimed that the multiple names of these undiscovered animals translate into hundreds of kinds of animals either. In fact, the whole point of our field guide was to identify approximately nine classes of unrecognized primates worldwide.

Radford also goes after us for including the story of the "Minnesota Iceman," citing the opinions of widely discredited Erik Beckjord as his "expert." We'll stand by the work of Vietnamese, French, Scottish, and American scientists on the matter.

Finally, Radford faults us for treating all accounts of these creatures with "equal weight and credibility." Of course, when Radford throws up straw arguments like young children, dead eyewitnesses, and unnamed sources, leaving out the degreed individuals who have seen these animals and are named in our book, he is pandering to the Jerry Springer mentality loose in the land. The burden of history is that these animals have been seen and encountered.

Loren Coleman
Portland, Maine

Patrick Huyghe
Putnam Valley, New York

*Benjamin Radford responds:*

*The credibility of Coleman and Huyghe's witnesses is far from a "straw argument." Quality, not quantity, of evidence is essential, and lots of weak evidence does not cumulatively add up to good evidence. It is true that a few of their witnesses have scholarly degrees, though I'm not sure what academic success has to do with not misidentifying animals. Anyone, degreed or not, can make a mistake. Allow me to quote one degreed witness, a fungus expert: "It is possible that I saw nothing more than a spider monkey . . ." (p. 155).*

*As for the "Minnesota Iceman," Beckjord is far from alone in concluding that the creature was a rubber model, not a "Neandertal killed in Vietnam." All other evidence aside, surely the only Bigfoot carcass in existence would likely be found in a museum, not on display at a traveling fair for a quarter a peek.*

*I find it telling that the authors didn't address many of my criticisms, sidestepping questions of why they ignore accounts of two- and six-toed creatures and how they justify giving myriad art depictions, folklore, and footprint finds equal credibility. I invite readers to study both texts and arrive at their own conclusions.*

## Velikovsky Symposium 25 Years Later

I am pleased that you printed the long letter from Leroy Ellenberger about the confrontation between Carl Sagan and Emmanuel Velikovsky at the 1974 AAAS meeting (Letters, March/April 2000). Ellenberger probably knows more about Velikovsky and the Velikovsky cult than anyone alive, but his knowledge of details may have obscured the essential message, especially in characterizing Sagan's purpose and approach. In his recent biography of Sagan, Keay Davidson writes: "The debate would constitute, in effect, an apology to Velikovsky [for previous slights from astronomers], giving him the opportunity to submit his ideas to direct scientific scrutiny. The debate's ultimate goal was not to reassess Velikovsky's ideas (hardly any scientist took these seriously), but, rather, to reassure the public of science's basic fairmindedness."

I believe that Sagan aimed his remarks (published in extended form in *Scientists Confront Velikovsky*) primarily at the public and science journalists. His critique is brilliant popular science writing, not a serious technical discussion of Velikovsky's ideas. In this vein, I agree with Ellenberger that some of Sagan's arguments, such as those concerning the probabilities of planetary collisions, are rather glib and rhetorical. Sagan also limited his subject to *Worlds in Collision* and did not address any other works by Velikovsky and his followers. These tactics infuriated Velikovsky supporters, who perceived that Sagan not only was attacking their hero, but that he also did not take them seriously enough to engage in what they would consider a true scientific debate. Thus, while many scientists criticized Sagan for stooping to engage with an obvious crank, Velikovsky fans castigated him for not engaging more seriously, for taking the easy way out by making the old man look ridiculous.

There is a serious dilemma in this story concerning with how far a skeptic should go in analyzing and refuting pseudoscience. Researchers recognize that an idea can be falsified based on only a limited number of errors or failed predictions, while proponents of pseudoscience depend in part on a large mass of anecdotes and arguments, which they filter through their own perceptions. This problem arises often for those who take the stage to debate creationists, only to be overwhelmed by obscure and to them irrelevant arguments. Incidentally, I find even today that some academics from outside the physical sciences question how Sagan and other astronomers could reject Velikovsky without reading his books and carefully studying his ideas. But it is easy for someone with sound technical training and physical intuition to recognize pseudoscience like that of Velikovsky. You don't have to consume an entire meal of spoiled food to spot the problem—one or two bites is enough. However, communicating such a critique to the public without seeming arrogant is a difficult challenge.

David Morrison
Saratoga, California

In the interest of accuracy and for the record (if I may be excused for being pedantic), David Morrison errs (Book Reviews, March/April 2000, p. 51) by overstating Carl Sagan's role in the 1974 AAAS symposium on Velikovsky when he states it was "organized by Sagan." The symposium was first suggested by Walter Orr Roberts, AAAS Past-President. Sagan then endorsed this initiative at the same time saying he was too busy to be involved "arranging such a sym-

posium," as Roberts wrote to *Pensee* editor S.L. Talbott in January 1973 (*Pensee VII*, p. 25). This account is corroborated by Donald Goldsmith in his introduction to *Scientists Confront Velikovsky*, saying that "in 1972 Sagan and Roberts managed to convince both Ivan King and Owen Gingerich . . . of the validity of their proposal" and then Sagan recruited Goldsmith. Thus, at the symposium King was not fully accurate when he told the audience that "the suggestion that we hold this symposium came originally from Professor Sagan" (quoted in *Pensee VII*, p. 42); but even King's remark does not support crediting Sagan with being an organizer, which role properly was filled by Gingerich, Goldsmith and King.

While this may seem to be a minor point, it is important if historical accuracy has any value. The commentaries on the Velikovsky affair have already been burdened with more than its fair share of distortions and misrepresentations.

Leroy Ellenberger
St. Louis, Missouri

## John Paul Stapp

The March/April 2000 News and Comment section featured a copy of John Paul Stapp's requiem. As his friend and confidant for some forty-six years, allow me to fill in parcels of his philosophical view.

Beyond all those impressive collections of engineering accomplishments and national rewards, there was a genuine intellectual. That characteristic was miraculously integrated with a daring similar to the test pilots and astronauts he worked with. But his drive was motivated by a never-ending search for new biophysical knowledge.

In my very first personal encounter, the colonel gave an impromptu dissertation on rewriting Hamlet! Prior to his death at age eighty-nine, John Paul was working on three books simultaneously. He would mentally construct complete chapters prior to dictation.

We had many philosophical discussions during those decades of friendship. The colonel (also Ph.D. and M.D.) was stimulated by my often far-out theories, but maintained a skeptical view of the metaphysical world, including religion. He always demanded hard data. At one formal presentation, his theme was "philosophers dream up ideal civilizations, but engineers build real ones."

Immortality? He had Hamlet's skepticism at best. We both agreed that there was minimal consideration of the void preceding conception; our lives sculpted in a brief consciousness between a brace of eternities.

One's legacy represents the only real-world parcel of immortality, and John Paul Stapp accumulated an imposing share. As part of his pioneering work in biophysics, he was the first to practically treat the acceleration of acceleration. Officially, the "Stapp" was offered as a unit for 1G/Sec, but finally lost out to 1 Jolt. "Immortality lost," he sighed.

In the short paper "Time and Universe" Stapp noted that, billions of years into the future, our present world could potentially be observed in far off galaxies, as photons from this era finally arrive there. If some advanced societies are capable of converting images into solid bodies, our doubles may roam the future. It's a nebulous form of immortality, but with better odds than those mythical dream worlds.

We agreed on a practical near future optimum scenario for immortality: live in perfect health until all your tasks and possible contributions are completed. "I'm stuck in the red zone, need some extra downs," the good doctor laughed.

The final curtain can only echo his deathless prose: "Through Endless Tranquil Ages I'll Repose."

Bernard "Duke" Gildenberg
Tularosa, New Mexico

## SETI Isn't UFOlogy

David Argall misses the point in his letter (March/April 2000) when he equates SETI with UFOlogy. There is nothing inherently unscientific in the search for an alien civilization, whether directly or by long distance since, in contrast to the search for a perpetual motion machine for example, no natural law would be violated by its existence. Where UFOlogy crosses the line into pseudoscience is in making extravagant claims about having succeeded in the search without any hard, verifiable evidence. SETI investigators may be unjustified in their optimism about the possibility of alien intelligence, but this is not at all the same thing. While the UFO literature is rife with claims of contact with alien beings, I suspect Mr. Argall would have great difficulty citing claims of this nature from SETI investigators.

One may question whether SETI is a worthwhile endeavor, given what many perceive to be a very low probability of success, but this is again separate from the issue of its scientific validity. . . .

Scott Stoeffler
Downers Grove, Illinois

Re: David Carl Argall's letter. I too am skeptical of the chances of success of the various SETI programs, and yet I run the SETI@home program on my home computer. Why? Because even if the odds against a result are overwhelming, the amount of effort/processing power is minimal. (The program runs in the background using spare processing power, and most of the time I am unaware of it.) The possible, albeit very unlikely, return for such a tiny outlay would be unimaginable. And I mean truly unimaginable compared to Argall's humorous (I assume) references to alien politicians or CIA.

Argall's reference to "decades of negative evidence" from UFO searches compared to the thus-far negative evidence from SETI is comparing apples and pears. The idea that aliens (if they exist) are physically visiting our little planet out of so many potential targets is pretty unlikely—and there has been no evidence that stands up to proper scrutiny. With SETI there are so many possible radio wavelengths (without even starting on the rest of the electromagnetic spectrum) that we have barely scratched the surface, and the effort involved is so negligible that even at very poor odds it is still worth it.

Ross Sargent
Folkestone, Kent, U.K

The letters column is a forum for views on matters raised in previous issues. Letters should be no more than 225 words. Due to the volume of letters not all can be published. Address letters to Letters to the Editor, SKEPTICAL INQUIRER. Send by mail (preferred) to 944 Deer Dr. NE, Albuquerque, NM 87122; by fax to 505-828-2080; or by e-mail to letters@csicop.org (include name and address).

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The organizations listed above have aims similar to those of CSICOP but are independent and autonomous. Representatives of these organizations cannot speak on behalf of CSICOP. Please send updates to Barry Karr, P.O. Box 703, Amherst, NY 14226-0703.

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# Center for Inquiry International

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## Light and Shadow in the Carina Nebula

Previously unseen details of a mysterious, complex structure within the Carina Nebula (NGC 3372) are revealed by this image of the "Keyhole Nebula," obtained with NASA's *Hubble Space Telescope. The picture is a mon*tage assembled from four different April 1999 telescope pointings with Hubble's Wide Field Planetary Camera 2, which used six different color filters.

Credit: NASA, The Hubble Heritage Team

The Committee for the Scientific Investigation of Claims of the Paranormal encourages the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and disseminates factual information about the results of such inquiries to the scientific community, the media, and the public. It also promotes science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues. To carry out these objectives the Committee:

- Sponsors publications
- Conducts public outreach efforts
- Maintains an international network of people and groups interested in critically examining paranormal, fringe-science, and other claims, and in contributing to consumer education
- Encourages research by objective and impartial inquiry in areas where it is needed
- Convenes conferences and meetings
- Conducts educational programs at all age levels
- Does not reject claims on a priori grounds, antecedent to inquiry, but examines them objectively and carefully

Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON

The Committee is a nonprofit scientific and educational organization.
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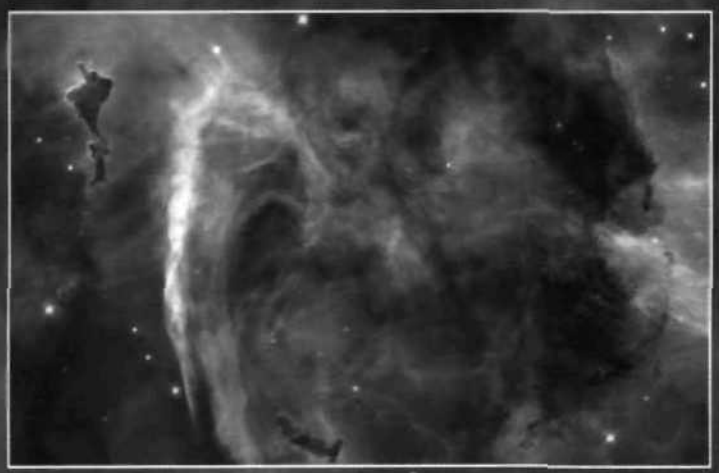
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